GE Medical Systems

Technical Publication

Direction 2300000
Revision 2

GE Medical Systems
LOGIQ™5 Service Manual

Operating Documentation

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GE MEDICAL SYSTEMS

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Revision History

Revision	Date	Reason for change
1	2002.11.21	Initial Release
2	2009.6.13	Correction for adding Functional Check Procedure after FRU replacement

List of Effected Pages

PAGES	REVISION	PAGES	REVISION	PAGES	REVISION
Title Page	2	1-1 to 1-14	1	Back Cover	N/A
Warnings i to iv	1	2-1 to 2-10	1		
Rev Hist/LOEP A-v to A-vi	2	3-1 to 3-28	1		
Table of Contents i to viii	2	4-1 to 4-26	2		
		5-1 to 5-44	1		
		6-1 to 6-14	1		
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Chapter 1
Introduction

Section 1-1
Overview

1-1-1 Purpose of Chapter 1

This chapter describes important issues related to safely servicing the LOGIQ™ 5 scanner. The service provider must read and understand all the information presented in this manual before installing or servicing a unit.

Table 1-1 Contents in Chapter 1

Section	Description	Page Number
1-1	Overview	1-1
1-2	Important Conventions	1-3
1-3	Safety Considerations	1-7
1-4	EMC, EMI, and ESD	1-13
1-5	Customer Assistance	1-14

1-1-2 Purpose of Service Manual

This Service Manual provides installation and service information for the LOGIQ™ 5 Ultrasound Scanning System and contains the following chapters:

1.) **Chapter 1 - Introduction:** Contains a content summary and warnings.
2.) **Chapter 2 - Pre-Installation:** Contains pre-installation requirements for the LOGIQ™ 5.
3.) **Chapter 3 - Installation:** Contains installation procedures.
4.) **Chapter 4 - Functional Checks:** Contains functional checks that are recommended as part of the installation, or as required during servicing and periodic maintenance.
5.) **Chapter 5 - Components and Fuctions (Theory):** Contains block diagrams and functional explanations of the electronics.
6.) **Chapter 6 - Service Adjustments:** Contains instructions on how to make available adjustments to the LOGIQ™ 5.
7.) **Chapter 7 - Diagnostics/Troubleshooting:** Provides procedures for running diagnostic or related routines for the LOGIQ™ 5.
8.) **Chapter 8 - Replacement Procedures:** Provides disassembly procedures and reassembly procedures for all changeable Field Replaceable Units (FRU).
9.) **Chapter 9 - Renewal Parts:** Contains a complete list of field replaceable parts for the LOGIQ™ 5.
10.) **Chapter 10 - Care & Maintenance:** Provides periodic maintenance procedures for the LOGIQ™ 5.

1-1-3 Typical Users of the Basic Service Manual

- Service Personnel (installation, maintenance, etc.).
- Hospital's Service Personnel
- Contractors (Some parts of Chapter 2 - Pre-Installation)

1-1-4 LOGIQ™ 5 Models Covered by this Manual

Table 1-2 LOGIQ™ 5 Model Designations

Part Number	Description
2331750	LOGIQ™ 5 Console for Japan
2331751	LOGIQ™ 5 Console for USA
2331752	LOGIQ™ 5 Console for Europe
2331753	LOGIQ™ 5 Console for Korea

1-1-5 Purpose of Operator Manual(s)

The Operator Manual(s) should be fully read and understood before operating the LOGIQ™ 5 and also kept near the unit for quick reference.

Section 1-2
Important Conventions

1-2-1 Conventions Used in Book

Icons

Pictures, or icons, are used wherever they reinforce the printed message. The icons, labels and conventions used on the product and in the service information are described in this chapter.

Safety Precaution Messages

Various levels of safety precaution messages may be found on the equipment and in the service information. The different levels of concern are identified by a flag word that precedes the precautionary message. Known or potential hazards are labeled in one of following ways:

DANGER **DANGER IS USED TO INDICATE THE PRESENCE OF A HAZARD THAT WILL CAUSE SEVERE PERSONAL INJURY OR DEATH IF THE INSTRUCTIONS ARE IGNORED.**

WARNING ***WARNING IS USED TO INDICATE THE PRESENCE OF A HAZARD THAT CAN CAUSE SEVERE PERSONAL INJURY AND PROPERTY DAMAGE IF INSTRUCTIONS ARE IGNORED.***

CAUTION **Caution is used to indicate the presence of a hazard that will or can cause minor personal injury and property damage if instructions are ignored.**

NOTICE **Equipment Damage Possible**

Notice is used when a hazard is present that can cause property damage but has absolutely no personal injury risk.

Example: Disk drive will crash.

NOTE: Notes provide important information about an item or a procedure. Information contained in a NOTE can often save you time or effort.

1-2-2 Standard Hazard Icons

Important information will always be preceded by the exclamation point contained within a triangle, as seen throughout this chapter. In addition to text, several different graphical icons (symbols) may be used to make you aware of specific types of hazards that could cause harm.

Table 1-3 Standard Hazard Icons

ELECTRICAL	MECHANICAL	RADIATION
LASER	**HEAT**	**PINCH**

Other hazard icons make you aware of specific procedures that should be followed.

Table 1-4 Standard Icons Indicating a Special Procedure Be Used

AVOID STATIC ELECTRICITY	TAG AND LOCK OUT	WEAR EYE PROTECTION

1-2-3 Product Icons

The following table describes the purpose and location of safety labels and other important information provided on the equipment.

Table 1-5 Product Icons

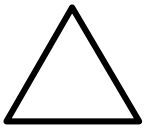
LABEL/SYMBOL	PURPOSE/MEANING	LOCATION
Identification and Rating Plate	Manufacturer's name and address Date of manufacture Model and serial numbers Electrical ratings	Rear of console near power inlet Under monitor On each probe
Device Listing/Certification Labels	Laboratory logo or labels denoting conformance with industry safety standards such as UL or IEC.	Rear of console Under front of monitor
Type/Class Label	Used to indicate the degree of safety or protection.	
IP Code (IPX8)	Indicates the degree of protection provided by the enclosure per IEC 529. IPX8 indicates drip proof.	Footswitch
	Equipment Type BF (man in the box symbol) IEC 878-02-03 indicates B Type equipment having even more electrical isolation than standard Type B equipment because it is intended for intimate patient contact.	Probe connectors PCG connector or Rear of Console
	Equipment Type CF (heart in the box symbol) IEC 878-02-05 indicates equipment having a high degree of protection suitable for direct cardiac contact.	ECG connector Surgical probes
	"CAUTION" The equilateral triangle is usually used in combination with other symbols to advise or warn the user.	Various
	ATTENTION - Consult accompanying documents " is intended to alert the user to refer to the operator manual or other instructions when complete information cannot be provided on the label.	Various

Table 1-5 Product Icons (Continued)

LABEL/SYMBOL	PURPOSE/MEANING	LOCATION
	"CAUTION - Dangerous voltage" (the lightning flash with arrowhead in equilateral triangle) is used to indicate electric shock hazards.	Various
	"Mains OFF" Indicates the power off position of the mains power switch.	Rear of system adjacent to mains switch
	"OFF/Standby" Indicates the power off/ standby position of the power switch. **CAUTION** **This Power Switch DOES NOT ISOLATE Mains Supply**	Adjacent to On-Off/Standby Switch
	"Mains ON" Indicates the power on position of the mains power switch. "ON" Indicates the power on position of the power switch. **CAUTION** **This Power Switch DOES NOT ISOLATE Mains Supply**	Front Panel Switch
	"Protective Earth" Indicates the protective earth (grounding) terminal.	Internal
	"Equipotentiality" Indicates the terminal to be used for connecting equipotential conductors when interconnecting (grounding) with other equipment.	Rear of console

Section 1-3
Safety Considerations

1-3-1 Introduction

The following safety precautions must be observed during all phases of operation, service and repair of this equipment. Failure to comply with these precautions or with specific warnings elsewhere in this manual, violates safety standards of design, manufacture and intended use of the equipment.

1-3-2 Human Safety

Operating personnel must not remove the system covers.
Servicing should be performed by authorized personnel only.
Only personnel who have participated in a LOGIQ™ 5 Training are authorized to service the equipment.

1-3-3 Mechanical Safety

WARNING ***WHEN THE UNIT IS RAISED FOR A REPAIR OR MOVED ALONG ANY INCLINE, USE EXTREME CAUTION SINCE IT MAY BECOME UNSTABLE AND TIP OVER.***

WARNING ***ULTRASOUND PROBES ARE HIGHLY SENSITIVE MEDICAL INSTRUMENTS THAT CAN EASILY BE DAMAGED BY IMPROPER HANDLING. USE CARE WHEN HANDLING AND PROTECT FROM DAMAGE WHEN NOT IN USE. DO NOT USE A DAMAGED OR DEFECTIVE PROBE. FAILURE TO FOLLOW THESE PRECAUTIONS CAN RESULT IN SERIOUS INJURY AND EQUIPMENT DAMAGE.***

WARNING ***NEVER USE A PROBE THAT HAS FALLEN TO THE FLOOR. EVEN IF IT LOOKS OK, IT MAY BE DAMAGED.***

CAUTION **Always lower and center the Opertaor I/O Panel before moving the scanner.**

CAUTION **The LOGIQ™ 5 weighs 180 kg or more, depending on installed peripherals, (500 lbs., or more) when ready for use. Care must be used when moving it or replacing its parts. Failure to follow the precautions listed could result in injury, uncontrolled motion and costly damage.**

ALWAYS:

Be sure the pathway is clear.

Use slow, careful motions.

Use two people when moving on inclines or lifting more than 16 kg (35 lbs).

1-3-3 Mechanical Safety (cont'd)

NOTE: Special care should be taken when transporting the unit in a vehicle:

- *Secure the unit in an upright position.*
- *Lock the wheels (brake)*
- *DO NOT use the Control Panel as an anchor point.*
- *Place the probes in their carrying case.*
- *Eject any Magneto Optical disk or CD from their drive.*

CAUTION **Keep the heat venting holes on the monitor unobstructed to avoid overheating of the monitor.**

1-3-4 Electrical Safety

To minimize shock hazard, the equipment chassis must be connected to an electrical ground. The system is equipped with a three-conductor AC power cable. This must be plugged into an approved electrical outlet with safety ground. If an extension cord is used with the system, make sure that the total current rating of the system does not exceed the extension cord rating.

The power outlet used for this equipment should not be shared with other types of equipment.

Both the system power cable and the power connector meet international electrical standards.

WARNING ***DO NOT SERVICE OR DISASSEMBLE PARTS UNDER FRU UNIT LEVEL AT ANY CIRCUMSTANCES.***

1-3-5 Label Locations

NOTE: For the symbols shown in the illustration below, refer to previous pages in this chapter.

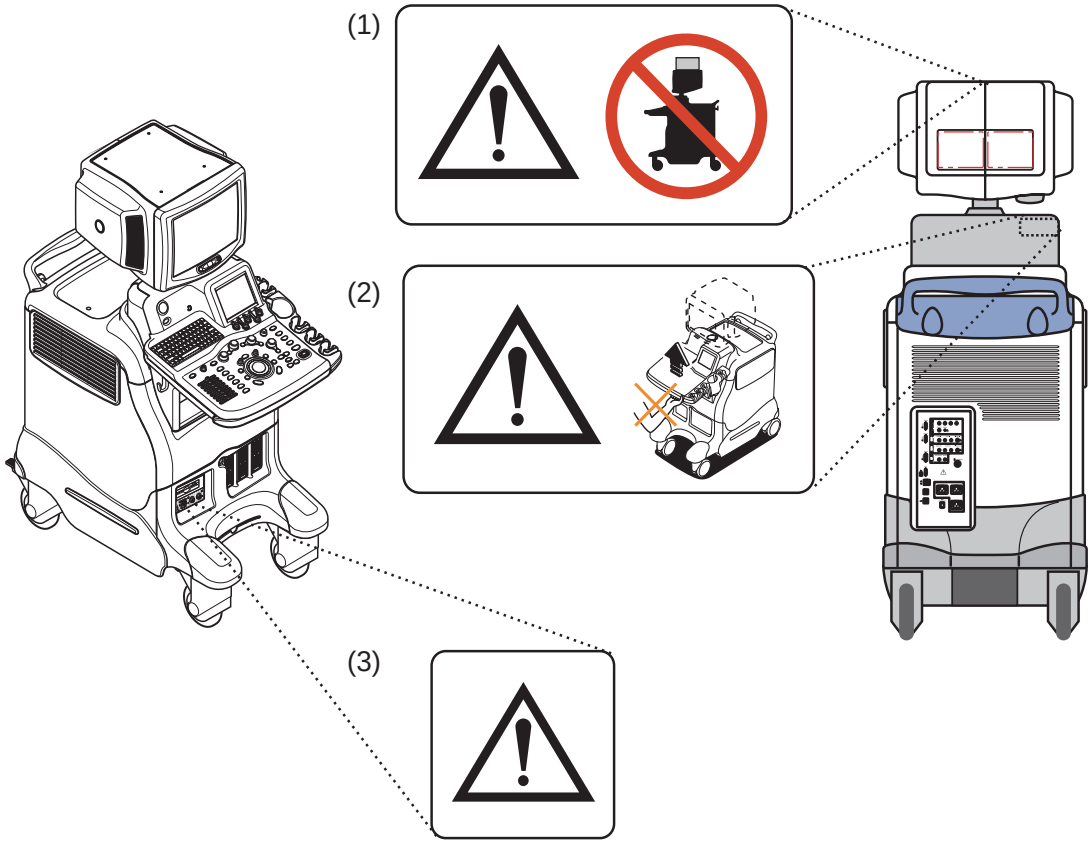


Figure 1-1 OUTSIDE MARKINGS OF LOGIQ™ 5 (Monitor)

1.) Caution for Possible injury : “Never put any device onto the Monitor”
2.) Caution for Hazardous movement : (Inside of the OP rear Cover)
3.) Defibrillator Label ““Do not use with Defibrillator”(On optional ECG Module)

1-3-5Label Locations (cont'd).

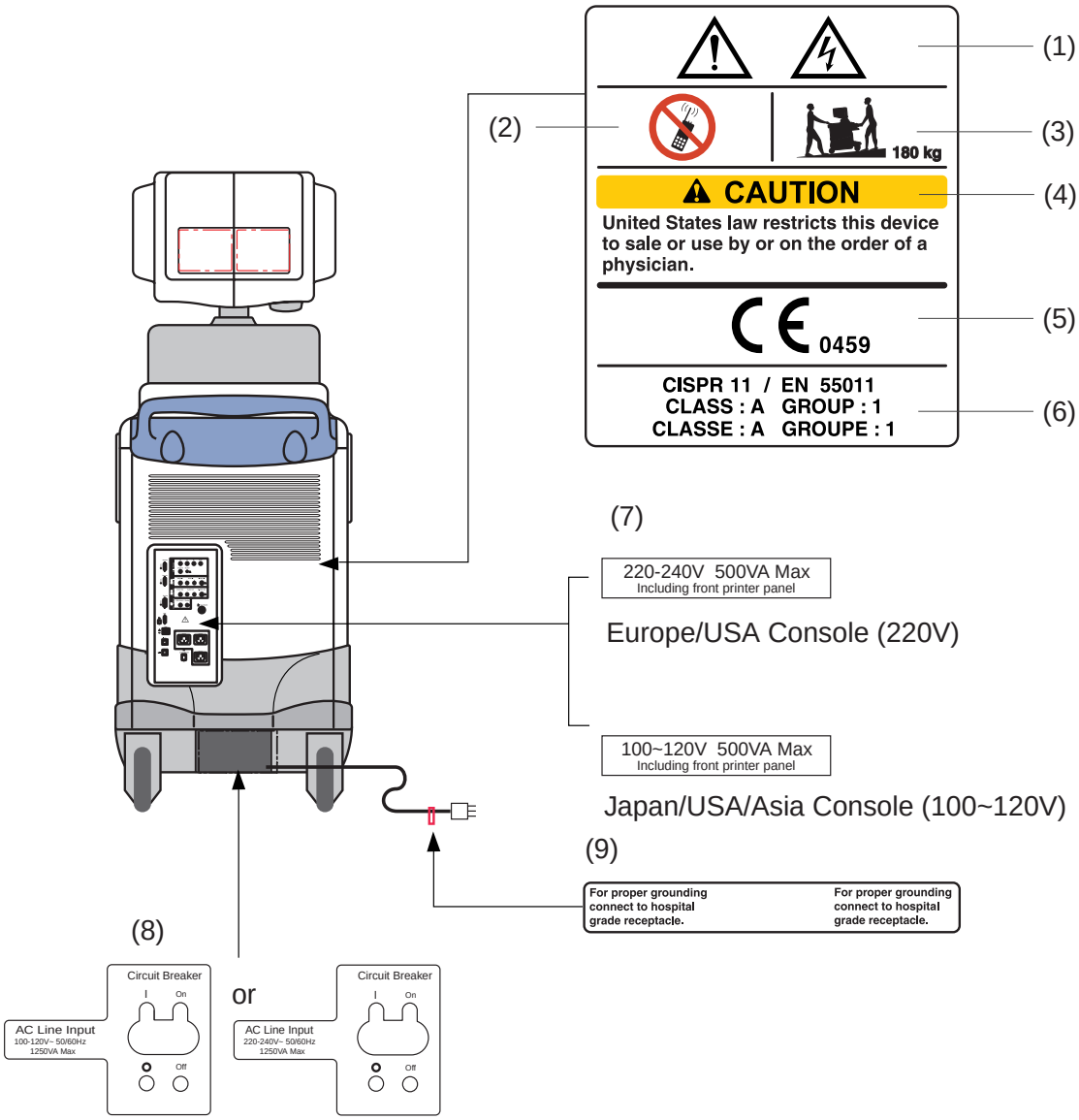


Figure 1-2 OUTSIDE MARKINGS OF LOGIQ™ 5 (Rear)

1.) Possible Shock Hazard
2.) Label -"Do not use the following devices near this equipment."
3.) Label - "The equipment weighs approximately 180kg.
4.) Prescription Devices
5.) CE Mark Label
6.) CISPR Label
7.) Voltage Range Indication Label
8.) Power Indication Label
9.) Grounding reliability Label.

1-3-5Label Locations (cont'd)

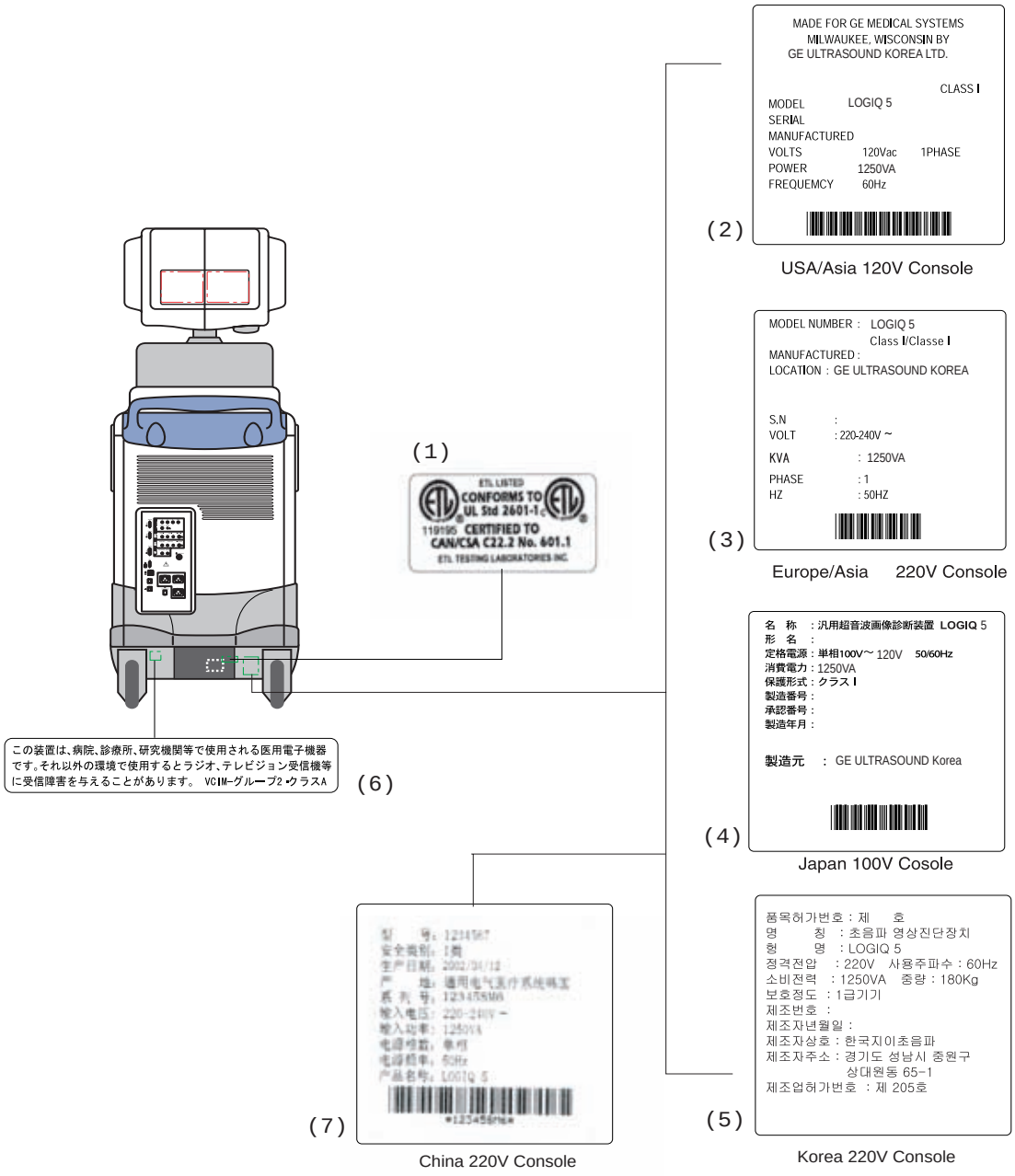


Figure 1-3 OUTSIDE MARKINGS OF LOGIQ™ 5

1.) ETL Label
2.) Identification and Rating Plate - USA/Asia 120V Console
3.) Identification and Rating Plate - Europe/Asia/Latin America 220V Console
4.) Identification and Rating Plate - Japan 100V Console
5.) Identification and Rating Plate - Korea 220V Console
6.) Caution EIAJ Label

1-3-6 Dangerous Procedure Warnings

Warnings, such as the examples below, precede potentially dangerous procedures throughout this manual. Instructions contained in the warnings must be followed.

DANGER **DANGEROUS VOLTAGES, CAPABLE OF CAUSING DEATH, ARE PRESENT IN THIS EQUIPMENT. USE EXTREME CAUTION WHEN HANDLING, TESTING AND ADJUSTING.**

WARNING ***EXPLOSION WARNING***

DO NOT OPERATE THE EQUIPMENT IN AN EXPLOSIVE ATMOSPHERE. OPERATION OF ANY ELECTRICAL EQUIPMENT IN SUCH AN ENVIRONMENT CONSTITUTES A DEFINITE SAFETY HAZARD.

WARNING ***DO NOT SUBSTITUTE PARTS OR MODIFY EQUIPMENT***

BECAUSE OF THE DANGER OF INTRODUCING ADDITIONAL HAZARDS, DO NOT INSTALL SUBSTITUTE PARTS OR PERFORM ANY UNAUTHORIZED MODIFICATION OF THE EQUIPMENT.

1-3-7 Lockout/Tagout Requirements (For USA Only)

Follow OSHA Lockout/Tagout requirements by ensuring you are in total control of the electrical Mains plug.

Section 1-4
EMC, EMI, and ESD

1-4-1 Electromagnetic Compatibility (EMC)

Electromagnetic compatibility describes a level of performance of a device within its electromagnetic environment. This environment consists of the device itself and its surroundings including other equipment, power sources and persons with which the device must interface. Inadequate compatibility results when a susceptible device fails to perform as intended due interference from its environment or when the device produces unacceptable levels of emission to its environment. This interference is often referred to as radio–frequency or electromagnetic interference (RFI/EMI) and can be radiated through space or conducted over interconnecting power of signal cables. In addition to electromagnetic energy, EMC also includes possible effects from electrical fields, magnetic fields, electrostatic discharge and disturbances in the electrical power supply.

1-4-2 CE Compliance

The LOGIQ™ 5 unit conforms to all applicable conducted and radiated emission limits and to immunity from electrostatic discharge, radiated and conducted RF fields, magnetic fields and power line transient requirements.

For applicable standards refer to the Safety Chapter in the Basic User Manual.

NOTE: ***For CE Compliance, it is critical that all covers, screws, shielding, gaskets, mesh, clamps, are in good condition, installed tightly without skew or stress. Proper installation following all comments noted in this service manual is required in order to achieve full EMC performance.***

1-4-3 Electrostatic Discharge (ESD) Prevention

⚠ **WARNING** ***DO NOT TOUCH ANY BOARDS WITH INTEGRATED CIRCUITS PRIOR TO TAKING THE NECESSARY ESD PRECAUTIONS:***

1.ALWAYS CONNECT YOURSELF, VIA AN ARM-WRIST STRAP, TO THE ADVISED ESD CONNECTION POINT LOCATED ON THE REAR OF THE SCANNER (TO THE RIGHT OF THE POWER CONNECTOR).

2.FOLLOW GENERAL GUIDELINES FOR HANDLING OF ELECTROSTATIC SENSITIVE EQUIPMENT.

Section 1-5
Customer Assistance

1-5-1 Contact Information

If this equipment does not work as indicated in this service manual or in the User Manual, or if you require additional assistance, please contact the local distributor or appropriate support resource, as listed below.

Prepare the following information before you call:

- System ID serial number.
- Software version.

Table 1-6 Phone Numbers for Customer Assistance

Location	Phone Number
USA/ Canada GE Medical Systems Ultrasound Service Engineering 4855 W. Electric Avenue Milwaukee, WI 53219 Customer Answer Center	1-800–437–1171 1-800-682-5327 1-262-524-5698 Fax: +1-414-647-4125
Latin America GE Medical Systems Ultrasound Service Engineering 4855 W. Electric Avenue Milwaukee, WI 53219 Customer Answer Center	1-262-524-5300 1-262-524-5698 Fax: +1-414-647-4125
Europe GE Ultraschall Deutschland GmbH& Co. KG BeethovenstraBe 239 Postfach 11 05 60, D-42665 Solingen Germany	Tel: +49 212 2802 208 +49 212 2802 207 Fax: +49 212 2802 431
Asia (Singapore/ Japan) GE Ultrasound Asia Service Department - Ultrasound 298 Tiong Bahru Road #15-01/06 Central Plaza Singapore 169730	Tel: +65 291-8528 +81 426-482950 Fax: +65 272-3997 +81 426-482902

1-5-2 System Manufacturer

Table 1-7 System Manufacturer

Manufacturer	FAX Number
GE Ultrasound Korea 462-120 65-1, Sangdaewon-dong, Joong-won-Gu, Seongnam-Si, Gyeonggi-do, Korea	82-31-740-6436

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Chapter 2
Pre-Installation

Section 2-1
Overview

2-1-1 Purpose of chapter 2

This chapter provides the information required to plan and prepare for the installation of a LOGIQ™ 5. Included are descriptions of the facility and electrical needs to be met by the purchaser of the unit. A checklist is also provided at the end of this section to help determine whether the proper planning and preparation is accomplished before the actual equipment installation is scheduled.

Table 2-8 Contents in Chapter 2

Section	Description	Page Number
2-1	Overview	2-1
2-2	General Console Requirements	2-2
2-3	Facility Needs	2-7

Section 2-2
General Console Requirements

2-2-1 Console Environmental Requirements

Table 2-9 Environmental Requirements for LOGIQ™ 5 Scanners

	Operational	Storage	Transport
Temperature	10 - 30 ^{O}C 50 - 104 ^{O}F	-10 - 60 ^{O}C 14 - 140 ^{O}F	-40 - 60 ^{O}C -40 - 140 ^{O}F
Humidity	30 - 85% non-condensing	30 - 90% non-condensing	30 - 90% non-condensing
Pressure	700 - 1060hPa	700 - 1060hPa	700 - 1060hPa

Table 2-10 Environmental Requirements for an Ultrasound Room

Item	Values
Power Source	Refer to Table 2-11 on page 2-3.
Current Rating	15A (120V-100V); 8A (220-240V) CIRCUIT BREAKER
Radiation Shielding	NONE REQUIRED for ULTRASOUND ENERGY
Temperature	20-26 DEG. C (68-79 DEG F) for PATIENT COMFORT
Humidity	50% to 70% for PATIENT COMFORT
Heat Dissipation	2000 BTU/Hr.
Floor Landing	Approximately 680 - 800 kg/m^2 without Accessories
Floor Condition	Gradient: WITHIN 5 degrees
Weight	180 kg (397lbs) without Accessories

2-2-1-1 Cooling

The cooling requirement for the LOGIQ™ 5 is 3500 BTU/hr. This figure does not include cooling needed for lights, people, or other equipment in the room. Each person in the room places an additional 300 BTU/hr. demand on the cooling system.

2-2-1-2 Lighting

Bright light is needed for system installation, updates and repairs. However, operator and patient comfort may be optimized if the room light is subdued and indirect. Therefore a combination lighting system (dim/bright) is recommended. Keep in mind that lighting controls and diameters can be a source of EMI which could degrade image quality. These controls should be selected to minimize possible interface.

2-2-2 Electrical Requirements

NOTE: GE Medical Systems requires a dedicated power and ground for the proper operation of its Ultrasound equipment. This dedicated power shall originate at the last distribution panel before the system.

Sites with a mains power system with defined Neutral and Live:

The dedicated line shall consist of one phase, a neutral (not shared with any other circuit), and a full size ground wire from the distribution panel to the Ultrasound outlet.

Sites with a mains power system without a defined Neutral:

The dedicated line shall consist of one phase (two lines), not shared with any other circuit, and a full size ground wire from the distribution panel to the Ultrasound outlet.

NOTE: Please note that image artifacts can occur, if at any time within the facility, the ground from the main facility's incoming power source to the Ultrasound unit is only a conduit.

2-2-2-1 LOGIQ™ 5 Power Requirements

The following power line parameters should be monitored for one week before installation. We recommend that you use an analyzer Dranetz Model 606-3 or Dranetz Model 626:

Table 2-11 Electrical Specifications for LOGIQ™ 5

PARAMETER	AREA	LIMITS
Voltage Range	100V	100 VAC ±10% (90-110 VAC)
	220V	220-240 VAC ±10% (198-264 VAC)
	115V	115 VAC ±10% (103-127 VAC)
Power	All applications	MAX. 1250 VA
Line Frequency	All applications	50/60Hz (±2Hz)
Power Transients	All applications	Less than 25% of nominal peak voltage for less than 1 millisecond for any type of transient, including line frequency, synchronous, asynchronous, or aperiodic transients.
Decaying Oscillation	All applications	Less than 15% of peak voltage for less than 1 millisecond.

2-2-2-2 Inrush Current

Inrush Current is not a factor to consider due to the inrush current limiting properties of the power supplies.

2-2-2-3 Site Circuit Breaker

It is recommended that the branch circuit breaker for the machine be ready accessible.

CAUTION **POWER OUTAGE MAY OCCURE.**

The LOGIQ™ 5 requires a dedicated single branch circuit. To avoid circuit overload and possible loss of critical care equipment, make sure you DO NOT have any other equipment operating on the same circuit.

2-2-2-4 Site Power Outlets

A desiccated AC power outlet must be within reach of the unit without extension cords. Other outlets adequate for the external peripherals, medical and test equipment needed to support this unit must also be present within 1 m (3.2 ft.) of the unit. Electrical installation must meet all current local, state, and national electrical codes.

2-2-2-5 Unit Power Plug

If the unit arrives without the power plug, or with the wrong plug, you must contact your GE dealer or the installation engineer must supply what is locally required.

2-2-2-6 Power Stability Requirements

Voltage drop-out
Max 10 ms.

Power Transients
(All applications)
Less than 25% of nominal peak voltage for less than 1 millisecond for any type of transient, including line frequency, synchronous, asynchronous, or aperiodic transients.

2-2-3 EMI Limitations

Ultrasound machines are susceptible to Electromagnetic Interference (EMI) from radio frequencies, magnetic fields, and transient in the air wiring. They also generate EMI. The LOGIQ™ 5 complies with limits as stated on the EMC label. However there is no guarantee that interface will not occur in a particular installation.

Possible EMI sources should be identified before the unit is installed.

Electrical and electronic equipment may produce EMI unintentionally as the result of defect.

These sources include:

- medical lasers,
- scanners,
- cauterizing guns,
- computers,
- monitors,
- fans,
- gel warmers,
- microwave ovens,
- light dimmers,
- portable phones.

The presence of broadcast station or broadcast van may also cause interference. See for EMI Prevention tips.

See Table 2-12 for EMI Prevention tips.

Table 2-12 EMI Prevention/abatement

EMI Rule	Details
Be aware of RF sources	Keep the unit at least 5 meters or 15 feet away from other EMI sources. Special shielding may be required to eliminate interference problems caused by high frequency, high powered radio or video broadcast signals.
Ground the unit	Poor grounding is the most likely reason a unit will have noisy images. Check grounding of the power cord and power outlet.
Replace all screws, RF gaskets, covers, cores	After you finish repairing or updating the system, replace all covers and tighten all screws. Any cable with an external connection requires a magnet wrap at each end. Install the shield over the front of card cage. Loose or missing covers or RF gaskets allow radio frequencies to interface with the ultrasound signals.
Replace broken RF gaskets	If more than 20% or a pair of fingers on the RF gaskets are broken, replace the gaskets. Do not turn on the unit until any loose metallic part is removed.
Do not place labels where RF gaskets touch metal	Never place a label where RF gaskets meet the unit. Otherwise, the gap created will permit RF leakage. Or, if a label has been found in such a position, move the label.
Use GE specified harnesses and peripherals	The interconnect cables are grounded and require ferrite beads and other shielding. Also, cable length, material, and routing are all important; do not change from what is specified.
Take care with cellular phones	Cellular phones may transmit a 5 V/m signal; that could cause image artifacts.
Properly dress peripheral cables	Do not allow cables to lie across the top of the card cage or hang out of the peripheral bays. Loop the excess length for peripheral cables inside the peripheral bays. Attach the monitor cables to the frame.

2-2-4 Scan Probe Environmental Requirements

Operation:10° to 30° C

Storage:--10° to 60° C

*NOTE: Temperature in degrees C. Conversion to Degrees F = (Degrees C * 9/5) + 32).*

NOTICE SYSTEMS AND ELECTRONIC PROBES ARE DESIGNED FOR STORAGE TEMPERATURES OF -20 TO + 50 degrees C. WHEN EXPOSED TO LARGE TEMPERATURE VARIATIONS, THE PRODUCT SHOULD BE KEPT IN ROOM TEMPERATURE FOR 10 HOURS BEFORE USE.

Section 2-3
Facility Needs

2-3-1 Purchaser Responsibilities

The work and materials needed to prepare the site is the responsibility of the purchaser. Delay, confusion, and waste of manpower can be avoided by completing pre installation work before delivery. User the Pre Installation checklist to verify that all needed steps have been taken,
Purchaser reasonability includes:

- Procuring the materials required.
- Completing the preparations before delivery of the ultrasound system.
- Paying the costs for any alternations and modifications not specifically provided in the sales contract.

NOTE: All electrical installation that are preliminary to the positioning of the equipment at the site prepared for the equipment must be performed by licensed electrical contractors. Other connections between pieces of electrical equipment, products involved (and the accompanying electrical installations) are highly sophisticated and special engineering competence is required. All electrical work on these product must comply with the requirements of applicable electrical codes. The purchaser of GE equipment must only utilize qualified personnel to perform electrical servicing on the equipment.

The desire to use a non-listed or customer provided product or to place an approved product further from the system than the interface kit allows presents challenges to the installation team. To avoid delays during installation, such variances should be made known to the individuals or group performing the installation at the earliest possible date (preferable prior to purchase).
The ultrasound suite must be clean proof to delivery of the machine. Carpet is not recommended because it collects dust and creates static. Potential sources of EMI (electromagnetic interference) should also be investigated before delivery. Dirt, static, and EMI can negatively impact system.

2-3-2 Required Features

NOTE: GE Medical Systems requires a dedicated power and ground for the proper operation of its Ultrasound equipment. This dedicated power shall originate at the last distribution panel before the system.

Sites with a mains power system with defined Neutral and Live:

The dedicated line shall consist of one phase, a neutral (not shared with any other circuit), and a full size ground wire from the distribution panel to the Ultrasound outlet.

Sites with a mains power system without a defined Neutral:

The dedicated line shall consist of one phase (two lines), not shared with any other circuit, and a full size ground wire from the distribution panel to the Ultrasound outlet.

Please note that image artifacts can occur, if at any time within the facility, the ground from the main facility's incoming power source to the Ultrasound unit is only a conduit.

- Dedicated single branch power outlet of adequate amperage meeting all local and national codes which is located less than 2.5 m (8 ft.) from the unit’s proposed location
- Door opening is at least 76 cm (30 in) wide
- Proposed location for unit is at least 0.3 m (1 ft.) from the wall for cooling
- Power outlet and place for any external peripheral are within 2 m (6.5 ft.) of each other with peripheral within 1 m of the unit to connect cables.

NOTE: The LOGIQ™ 5 has four outlets inside the unit. One is for the monitor and three for on board peripherals.

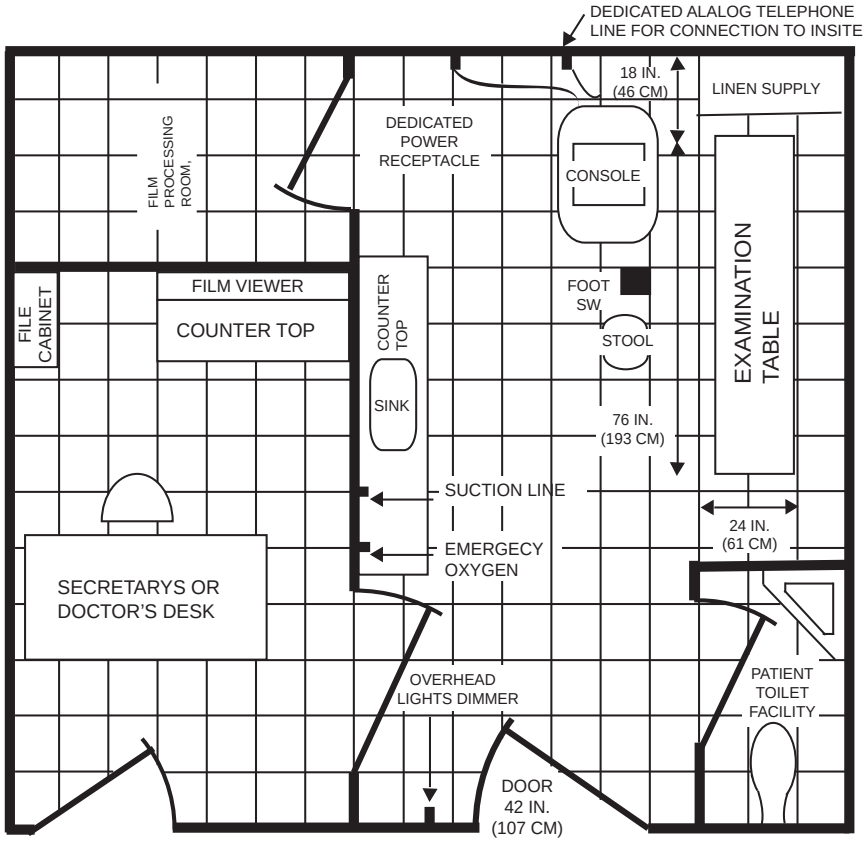
- Power outlets for other medical equipment and gel warmer
- Power outlets for test equipment and modem within 1 m (3.2 ft.) of unit
- Clean and protected space to store transducers (in their cases or on a rack)
- Material to safely clean probes (done with a plastic container, never metal)

2-3-3 Desirable Features

- Door is at least 92 cm (3 ft.) wide
- Circuit breaker for dedicated power outlet is easily accessible
- Sink with hot and cold water
- Receptacle for bio–hazardous waste, like used probe sheaths
- Emergency oxygen supply
- Storage for linens and equipment
- Nearby waiting room, lavatory, and dressing room
- Dual level lighting (bright and dim)
- Lockable cabinet ordered by GE for its software and proprietary manuals.

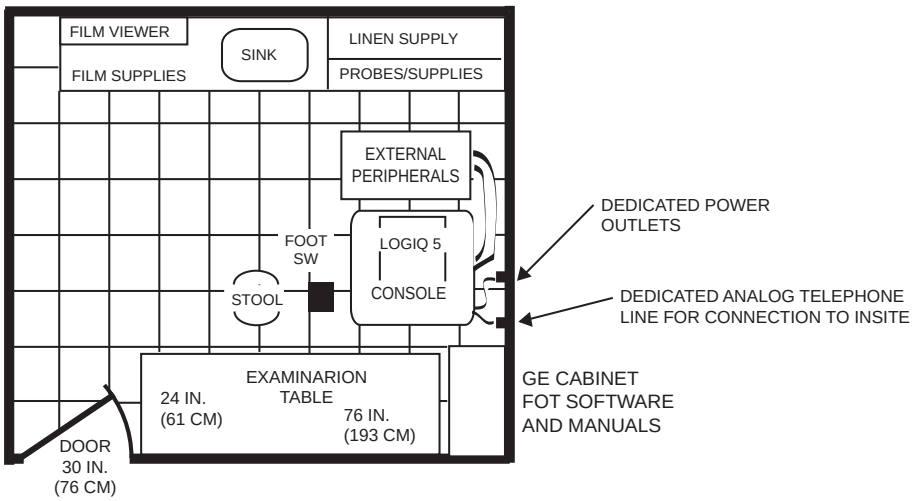
2-3-4 Recommended and Alternate Ultrasound Room Layout

Recommended standard floor plan and a minimal floor plan for ultrasound equipment:



A 14 by 17 foot Recommended Floor Plan

Scale : Each square equals one square foot



An 8 by 10 foot Minimal Floor Plan

Figure 2-4 RECOMMENDED ULTRASOUND ROOM LAYOUT

2-3-5 Networking Pre-installation Requirements

2-3-5-1 Purpose of DICOM Network Function

DICOM services provide the operator with clinically useful features for moving images and patient information over a hospital network. Examples of DICOM services include the transfer of images to workstations for viewing or transferring images to remote printers. As an added benefit, transferring images in this manner frees up the on-board monitor and peripherals, enabling viewing to be done while scanning continues. With DICOM, images can be archived, stored, and retrieved faster, easier, and at a lower cost.

2-3-5-2 DICOM Option Pre-installation Requirements

To configure the LOGIQ™ 5 to work with other network connections, the site's network administrator must provide some necessary information.

Information must include:

- A host name, local port number, AE Title, IP address and Net Mask for the LOGIQ™ 5.
- The IP addresses for the default gateway and other routers at the site for ROUTING INFORMATION.
- The host name, IP address, port and AE Title for each device the site wants connected to the LOGIQ™ 5 for DICOM APPLICATION INFORMATION. A field for the make (manufacturer) and the revision of the device, is also included. This information may be useful for solving errors.

2-3-5-2 DICOM Option Pre-installation Requirements (cont'd)

LOGIQ™ 5 **Host Name**

Local Port

IP Address . . .

AE Title

Net Mask . . .

ROUTING INFORMATION

Destination IP Addresses

GATEWAY IP Addresses

Default . . .

ROUTER1 . . .

ROUTER2 . . .

ROUTER3 . . .

DICOM APPLICATION INFORMATION

	NAME	MAKE/REVISION	AE TITLE	IP ADDRESSES	PORT
Store 1				. . .	
Store 2				. . .	
Store 3				. . .	
Store 4				. . .	
Store 5				. . .	
Store 6				. . .	
Worklist				. . .	
Storage Commit				. . .	
MPPS				. . .	

Figure 2-5 Worksheet for DICOM Network Information

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Chapter 3
Installation

Section 3-1
Overview

3-1-1 Purpose of Chapter 3

This chapter contains information needed to install the unit. Included are references to a procedure that describes how to receive and unpack the equipment and how to file a damage or loss claim.
How to prepare the facility and unit of the actual installation, and how to check and test the unit, probes, and external peripherals for electrical safety are included in this procedure. Also included in this section are guidelines for transporting the unit to a new site.

Table 3-1 Contents in Chapter 3

Section	Description	Page Number
3-1	Overview	3-1
3-2	Installation Reminders	3-1
3-3	Receiving and Unpacking Equipemnt	3-4
3-4	Preparing for Installation	3-10
3-5	Completing the Installation	3-11
3-5	System Configuration	3-14
3-6	Installation Paperwork	3-21

Section 3-2
Installation Reminders

3-2-1 Average Installation Time

Table 3-2 Average Installation Time

Description	Average Installation Time	Comments
Unpacking the scanner	0.5 hour	
Scanner wo/options	0.5 hour	Dependant on the configuration that is required
DICOM Option	0.5 hour	Dependant on the amount of configuration
InSite Option	0.5 hour	

The LOGIQ™ 5 has been designed to be installed and checked out by an experienced service technician in approximately four hours. LOGIQ™ 5 consoles with optional equipment may take slightly longer.

3-2-2 Installation Warnings

1.) Since the LOGIQ™ 5 weighs approximately 180 kg. (397 lb) without options, preferably two people should unpack it. Two people are also preferable for installing any additional bulky items.

2.) There are no operator serviceable components. To prevent shock, do not remove any covers or panels. Should problems or malfunctions occur, unplug the power cord. Only qualified service personnel should carry out servicing and troubleshooting.

NOTE: For information regarding packing labels, refer to LABELS ON PACKAGE.

3.) After being transported, the unit may be very cold or hot. If this is the case, allow the unit to acclimate before you turn it on. It requires one hour for each 2.5°C increment it's temperature is below 10°C or above 40°C.

CAUTION **Equipment damage possibility. Turning the system on without acclimation after arriving at site may cause the system to be damaged.**

Table 3-3 Acclimation Time

°C	60	55	50	45	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40
°F	140	131	122	113	104	96	86	77	68	59	50	41	32	23	14	5	-4	-13	-22	-31	-40
hrs	8	6	4	2	0	0	0	0	0	0	0	2	4	6	8	10	12	14	16	18	20

3-2-3 Safety Reminders

DANGER **WHEN USING ANY TEST INSTRUMENT THAT IS CAPABLE OF OPENING THE AC GROUND LINE (I.E., METER'S GROUND SWITCH IS OPEN), DON'T TOUCH THE UNIT!**

CAUTION **Two people should unpack the unit because of its weight. Two people are required whenever a part weighing 19kg (35 lb.) or more must be lifted.**

CAUTION **If the unit is very cold or hot, do not turn on its power until it has had a chance to acclimate to its operating environment.**

CAUTION **To prevent electrical shock, connect the unit to a properly grounded power outlet. Do not use a three to two prong adapter. This defeats safety grounding.**

CAUTION **Do NOT wear the ESD wrist strap when you work on live circuits and more than 30 V peak is present.**

CAUTION **Do not use a 20 Amp to 15 Amp adapter on the 120 Vac unit's power cord. This unit requires a dedicated 20 A circuit and can have a 15A plug if the on board peripherals do not cause the unit to draw more than 14.0 amps.**

CAUTION **Do not operate this unit unless all board covers and frame panels are securely in place. System performance and cooling require this.**

CAUTION **OPERATOR MANUAL(S)**
The User Manual(s) should be fully read and understood before operating the LOGIQ™ 5 and kept near the unit for quick reference.

CAUTION **ACOUSTIC OUTPUT HAZARD**
Although the ultrasound energy transmitted from the LOGIQ™ 5 probe is within FDA limits, avoid unnecessary exposure. Ultrasound energy can produce heat and mechanical damage.

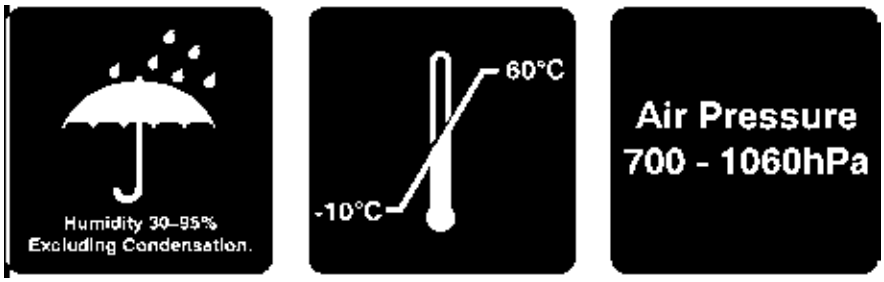

Figure 3-6 Environmental Labels

Section 3-3
Receiving and Unpacking the Equipment

When a new system arrives, check that any components are not damaged and are not in short supply. If shipping damage or shortage occurs, contact the address shown in Chapter 1.

CAUTION **Do not lift the unit by the Keyboard. Equipment damage may result.**

CAUTION **The crate with the LOGIQ™ 5 weighs approximately 180 kg. (397 lb) Be prepared for a sudden shift of weight as the unit is removed from its base (pallet)**

1.) Cut the three PLASTIC BANDs.

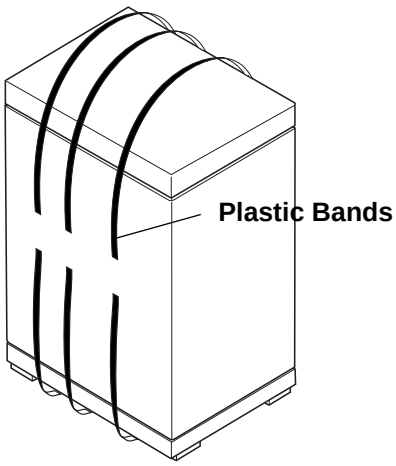

Figure 3-7 Cutting the Plastic Bands.

Section 3-3 Receiving and Unpacking the Equipment (cont'd)

2.) Lift the TOP COVER up and off.

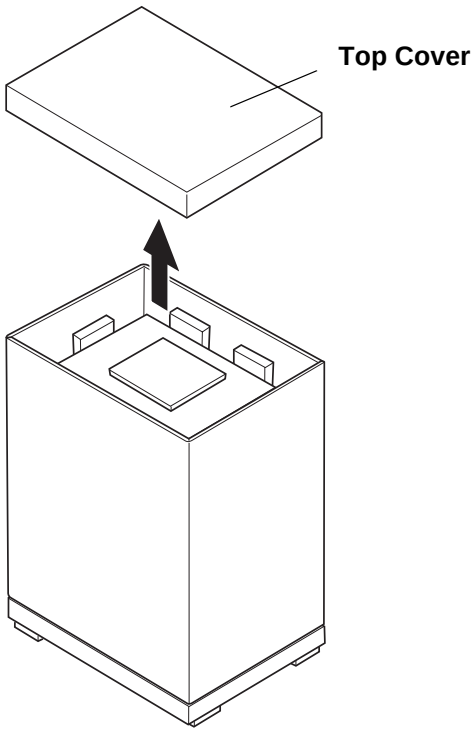

Figure 3-8 Removing the top Cover

Section 3-3 Receiving and Unpacking the Equipment (cont'd)

3.) Remove the MONITOR CAP up and off..

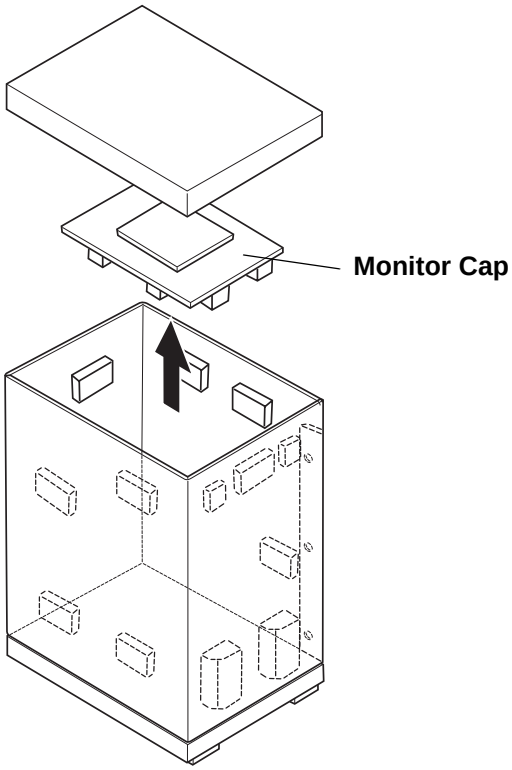

Figure 3-9 Removing the monitor cap

Section 3-3 Receiving and Unpacking the Equipment (cont'd)

4.) Remove the three PLASTIC JOINTs from the OUTER SLEEVE
5.) Remove the OUTER SLEEVE.
6.) Remove the INNER SLEEVE.

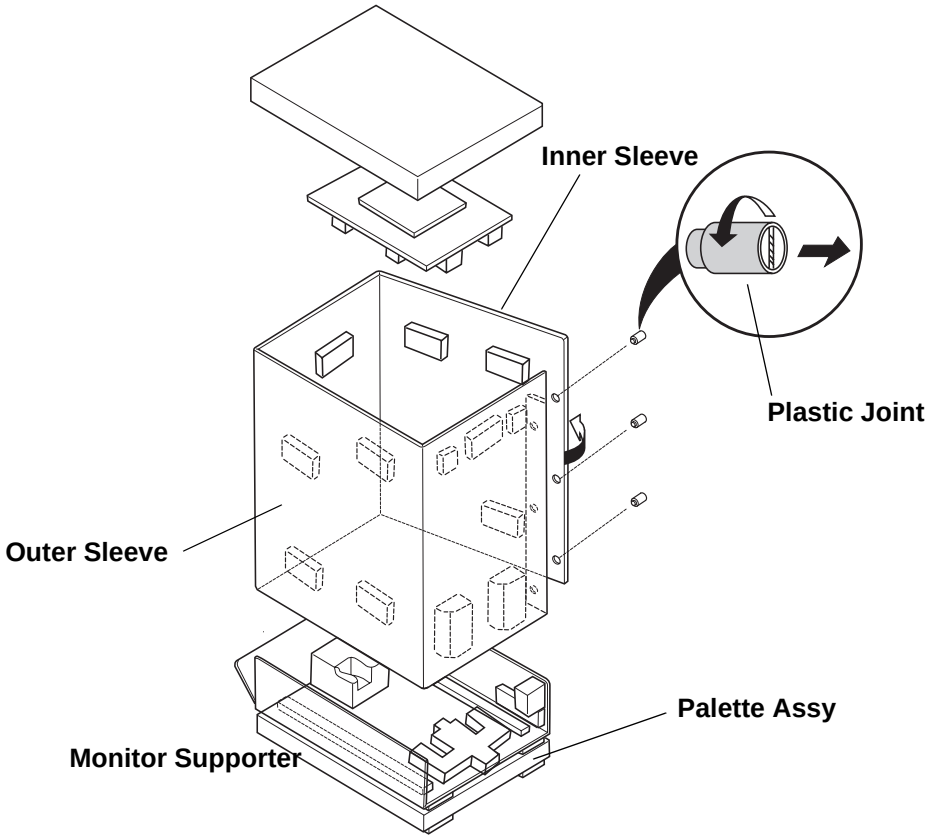

Figure 3-10 Removing Plastic Joints and Sleeves

Section 3-3 Receiving and Unpacking the Equipment (cont'd)

7.) Remove the PLASTIC BAG.
8.) Lift the Monitor up by pressing the UP/Down Release Button.
9.) Remove the MONITOR SUPPORTER.
10.) Pull the Bottom Plate from the bottom so that it can be used as a ramp.
11.) Unlock the front caster and carefully put the console off the PALETTE.

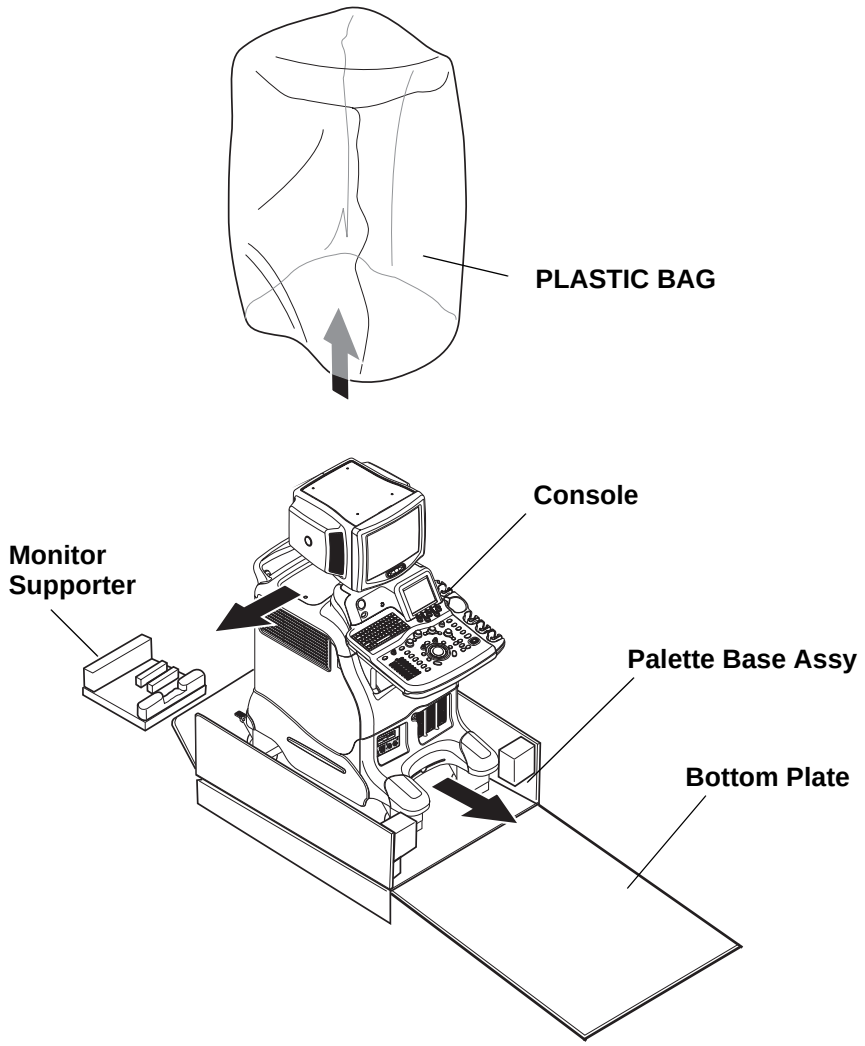

Figure 3-11 Moving the LOGIQ™ 5 from the crate

3-3-1 Moving into Position

CAUTION **Do not lift the unit by the Keyboard.**
Do not tilt the unit more than 5 degrees to avoid tipping it over.
To avoid injury by tipping over. Set the monitor to the lowest position before moving.

CAUTION **Equipment Damage Possibility. Lifting the console by holding covers may damage the covers.**
Do not lift the console by holding any covers.

In general, a single adult can move the LOGIQ™ 5 along an even surface with no steep grades. At least two people should move the machine when large humps, grooves, or grades will be encountered. (It is better to pull from the rear rather than push from the front of the unit). Before moving, store all loose parts in the unit. Wrap transducers in soft cloth or foam to prevent damage.

Although LOGIQ™ 5 is a compact and mobile machine, two people should move it over rough surfaces or up and down grades.

3-3-2 Adjusting System Clock

Set the system clock for the LOGIQ™ 5 to the local time. For procedure of adjusting the system clock, refer to section 3-6-1-1 on page 15.

Fill out proper customer Information the Product Locator Installation Card. Mail this Installation Card “Product Locator” to the address corresponding to your pole.

3-3-3 Product Locator Installation Card

NOTE: The Product Locator Installation Card shown may not be same as the provided Product Locator card.

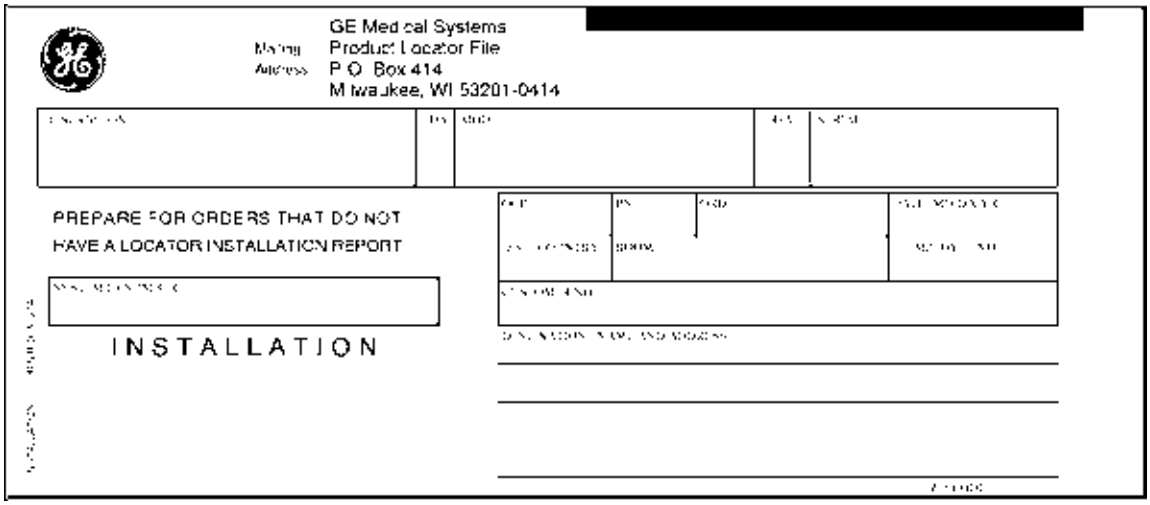

Figure 3-12 Product Locator Installation Card

Section 3-4
Preparing for Installation

3-4-1 Verify Customer Order

Compare items received by the customer to that which is listed on the delivery order. Report any items that are missing, back ordered or damaged.

3-4-2 Physical Inspection

3-4-2-1 System Voltage Settings

Verify that the scanner is set to the correct voltage.
The Voltage settings for the LOGIQ™ 5 Scanner is found on a label to the right of the Power switch and External I/O, on the rear of the system.For the Rating Plate example, refer to Figure 1-3 "OUTSIDE MARKINGS OF LOGIQ™ 5" on page 1-11

WARNING ***Connecting a LOGIQ™ 5 scanner to the wrong voltage level will most likely destroy the scanner.***

3-4-2-2 Video Formats

Check that the video format is set to the locally used video standard, NTSC or PAL.

3-4-3 EMI Protection

This Unit has been designed to minimize the effects of Electro Magnetic Interference (EMI). Many of the covers, shields, and screws are provided primarily to protect the system from image artifacts caused by this interference. For this reason, it is imperative that all covers and hardware are installed and secured before the unit is put into operation.

Section 3-5
Completing the Installation

3-5-1 Power On/Boot Up

NOTE: After turning off the system, wait at least ten seconds before turning it on again. The system may not be able to boot if power is recycled too quickly.

3-5-1-1 Scanner Power On

1.) Connect the Main Power Cable at the rear of the System.

WARNING ***Protective earth must be taken when connecting AC power cable (200V) without its plug to wall outlet.***

2.) Connect the Main Power cable to an appropriate mains power outlet.

3.) Switch ON the Main Circuit Breaker at the rear of the System.

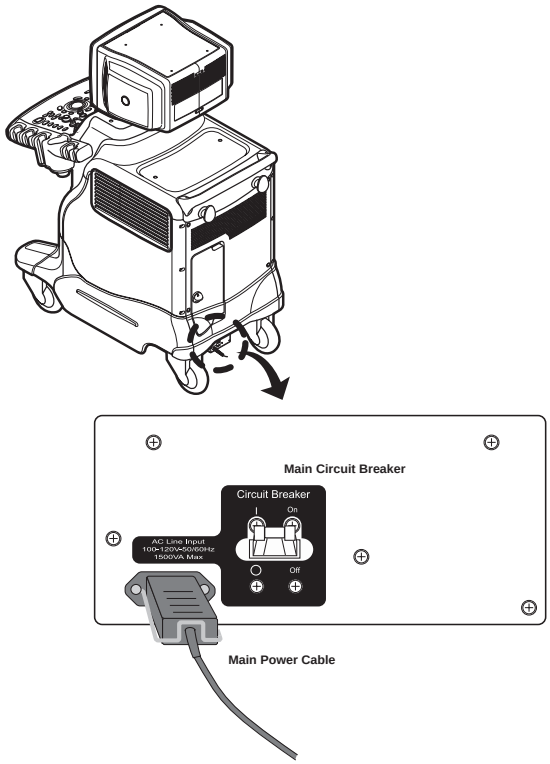

Figure 3-13 Circuit Breaker

When power is applied to the Scanner, and the Rear Circuit breaker is turned ON, Power is distributed to the Fans, Control panel, Monitor, Internal and External I/O's, Cage Boards, Peripherals and the Backend Processor. When the Power ON/OFF key is pressed once, the Backend Processor starts and its software code is distributed to initiate the scanner.

3-5-1-1 Scanner Power On (cont'd)

4.) Press the **ON/OFF** key at the front of the System once.

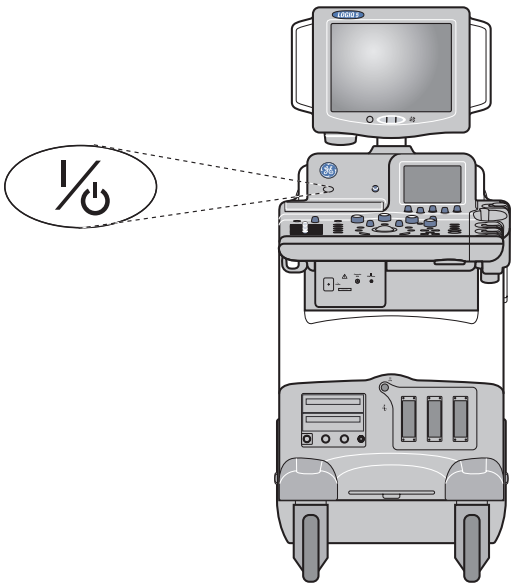

Figure 3-14 Power On/Off Standby Switch Location

3-5-1-2 Power Up Sequence

1.) The Start Up Screen will be shown on the Monitor display when the system is turned ON.

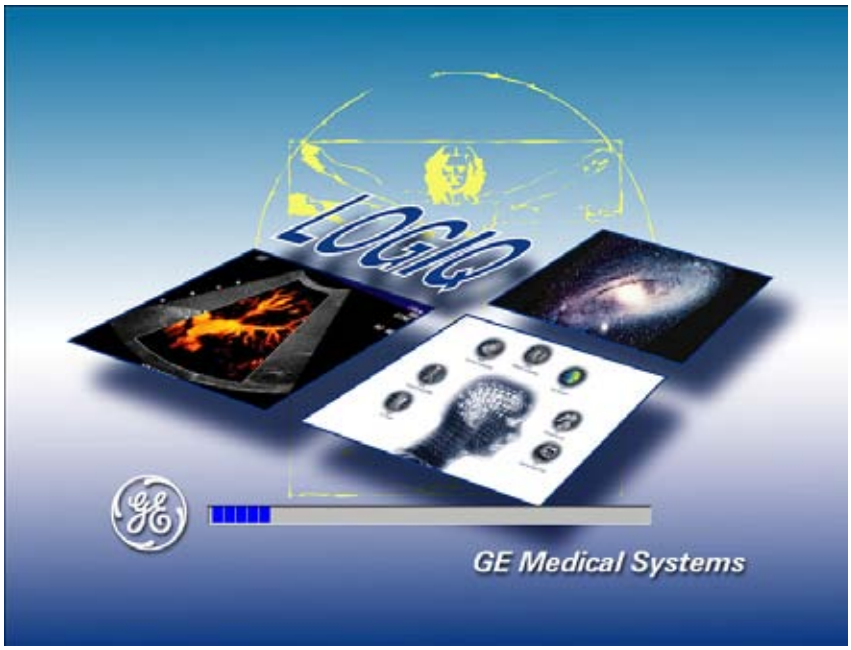

Figure 3-15 Start Up Screen Display

2.) After initialization is complete, all lighted buttons on the Control Panel light and the default B-Mode screen or Patient screen (no probes are connected) is displayed on the monitor display.

3-5-1-3 Power Up Sequence

1.) The Start Up Screen will be shown on the Monitor display when the system is turned ON.

2.) Then Start Loader display will be shown on the Monitor display. Then the scanner is booted up automatically.

NOTE: To enter the Maintenance Mode, select Maintenance button.

NOTE: Figure 8-4 displays when Service Dongle inserted in Rear Panel.

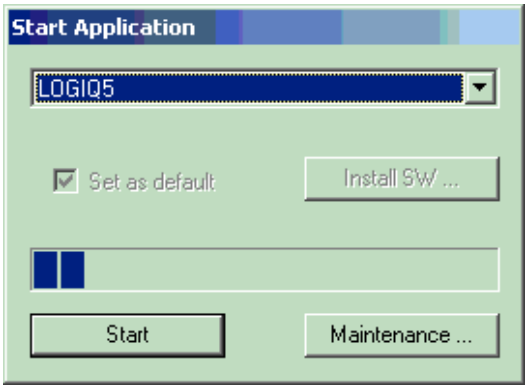

Figure 3-16 Start Application Window

NOTE: Start is selected automatically when it time out.

3-5-2 Power Off/ Shutdown

NOTE: After turning off a system, wait at least ten seconds before turning it on again. The system may not be able to boot if power is recycled too quickly.

3-5-2-1 Power Shutdown

1.) Press the **ON/OFF** key at the front of the System for about two (2) seconds. Refer to Figure 3-14 on page 3-12 .

2.) Switch OFF the Main Circuit Breaker at the rear of the system Refer to Figure 3-13 on page 3-11 .

3.) Disconnect the Main Power Cable is necessary. *For example : Relocating the scanner.*

NOTICE Disconnecting the Mains Power Cable *before* switching OFF the Circuit Breaker will activate the uninterruptible power system (UPS) in the backend processor, forcing an ordered shutdown of the system.

NOTICE The UPS serves *only* as a battery backup that allows for a soft shut-down of the scanner to prevent file corruption. **IT DOES NOT REGULATE INCOMING VOLTAGE**.

3-5-3 Transducer Connection

1.) Connect a transducer to one of the three rightmost transducer receptacle as follows:

A.) Ensure that the transducer twist lock lever to the horizontal position.

B.) Insert the transducer connector on the receptacle guide pin until it touches the receptacle mating surface.

C.) Twist the transducer twist lock lever to vertical position to lock it in place. Twist the lever to the horizontal position to disconnect the transducer.

NOTE: It is not necessary to turn OFF power to connect or disconnect a transducer.

Section 3-6
System Configuration

3-6-1 System Specifications

3-6-1-1 System Settings

Table 3-1 System Configuration

Configuration Category	Description
Settings	Enables the user or service personnel to set the date, time, unit, language, basic information about the organization such as the institution name and department.

1.) Power OFF the scanner.

2.) The SYSTEM EXIT window appears. Click on **Logoff.**

Figure 3-17 System EXIT window

3.) The message window appears. Click on **OK.**

4.) The OPERATOR LOGIN window appears.
Change the User level to **Admin,** then enter **Password**. Then click on **Log on.**

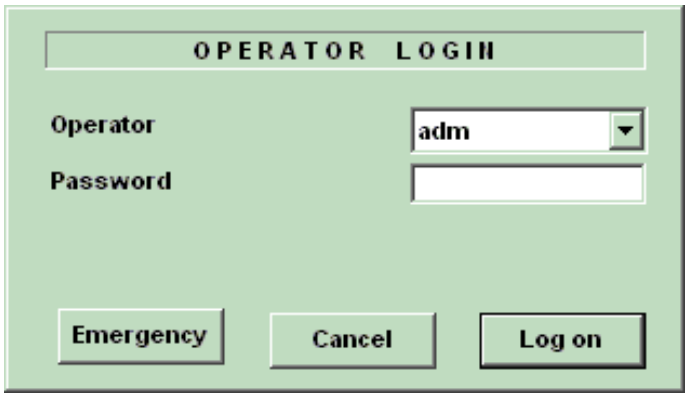

Figure 3-18 Operator LOGIN window

3-6-1-1 System Settings (cont'd)

5.) Select **Utility > System.**

6.) Set the **Hospital name, Department, Date and Time, Language,** and **Units.**

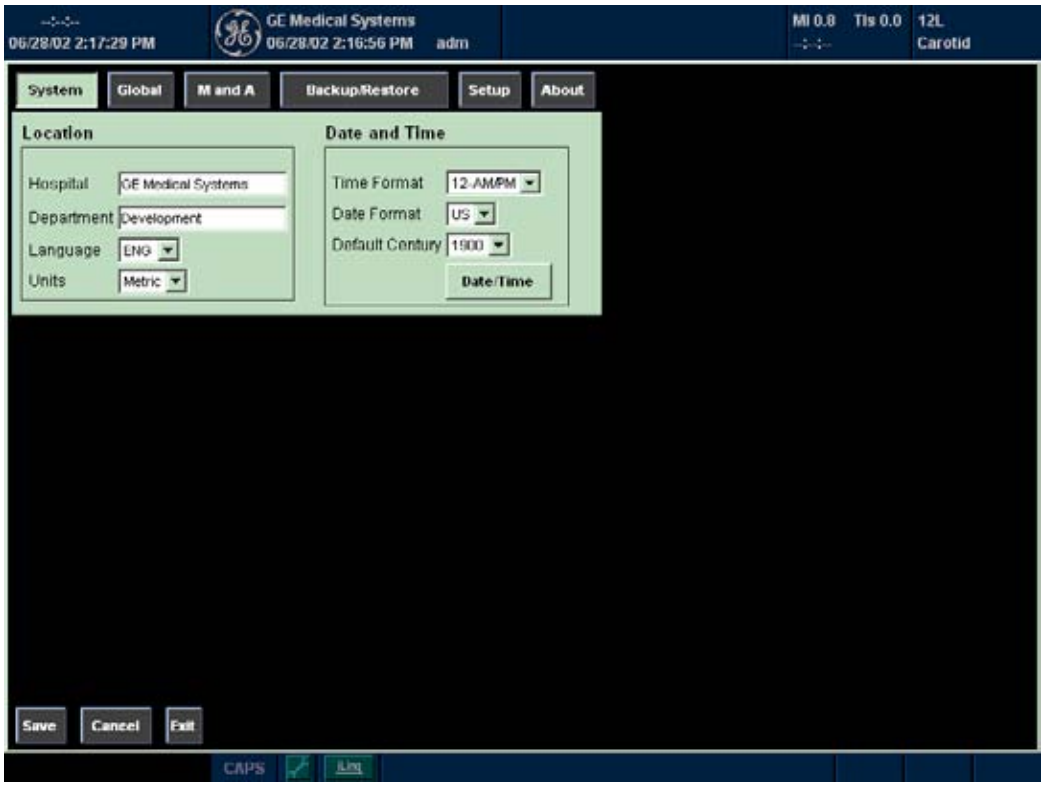

Figure 3-19 Setting Display

Click on **Utilities** to terminate the utility function.

3-6-1-2 Physical Dimensions

The physical dimensions of the LOGIQ™ 5 unit are summarized in Table 3-2 on page 3-17 . The Size of LOGIQ™ 5, with monitor and peripherals

Table 3-2 Physical Dimensions of LOGIQ™ 5

Height	Width	Depth	Unit
135 - 145	52.0	99.0	cm
53.1 - 57.08	20.47	38.9	inches

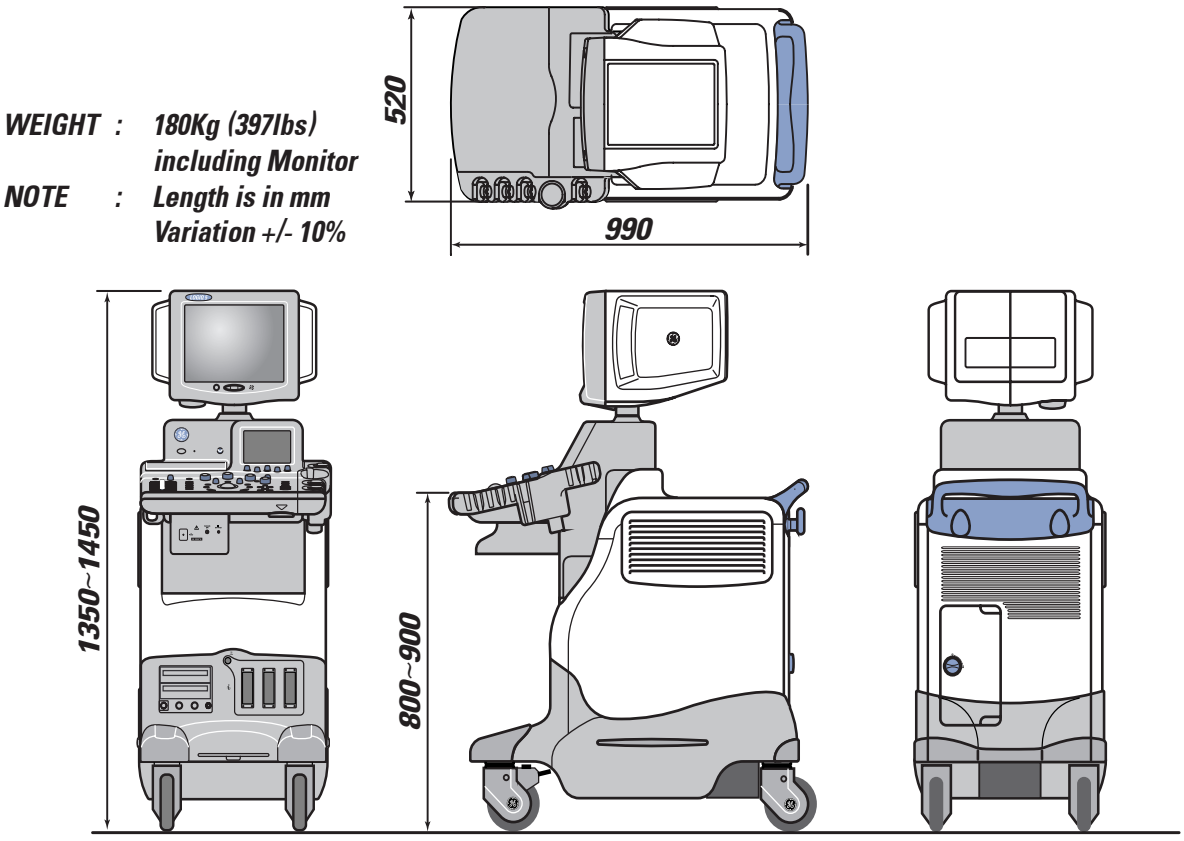

Figure 3-20 Overall Dimensions

3-6-1-3 Weight without Monitor and Peripherals

Table 3-3 Weight of LOGIQ™ 5 With Monitor and Without Other Peripherals

Model	Weight [kg]	Weight [lbs]
LOGIQ™ 5	Approximately 180	Approximately 397

3-6-1-4 Acoustic Noise Output:

Less than 70dB (A) according to DIN 45635 - 19 - 01 - KL2.

3-6-2 Electrical Specifications

Table 3-4 Electrical Specifications for LOGIQ™ 5

System	Voltage	Current	Frequency
1	110 ~ 120 VAC	10~12A	50~60Hz
2	220 ~ 240 VAC	5~5.5A	50~60Hz

3-6-3 On-Board Optional Peripherals

Table 3-5 List of Recording Devices

Device	Manufacturer	Model	Video Signal
B/W Video Printer	SONY	UP-895MDW	NTSC/PAL
B/W Video Printer	Mitsubishi	P-91(AP9500) P91W P91E	NTSC NTSC/PAL NTSC/PAL
Video Cassette Recorder	SONY	SVO-9500MD SVO-9500-MDP	NTSC PAL
Video Cassette Recorder	Panasonic	AG-MD835 AG-MD835P AG-MD835E	NTSC NTSC PAL
A6 Color Video Printer	SONY	UP-21MD UP-21MDS	NTSC/PAL NTSC
A6 Color Video Printer	Mitsubishi	CP-900 CP900UM CP-900E	
A5 Color Video Printer	SONY	UP-50 UP51MD	NTSC NTSC/PAL
A5 Color Printer	Mitsubishi	CP-800 CP-800UM CP800E	

See each option installation instructions for installation and connection procedures.

NOTE: There are no external peripheral options for the LOGIQ™ 5

3-6-4 External I/O Connector Panel

Located on the rear panel are video input and output connectors, audio input and output, camera expose connectors, footswitch connector power connector and control connections for VCR, printer, and service tools.

This section indicates the pin assignment for each connector.

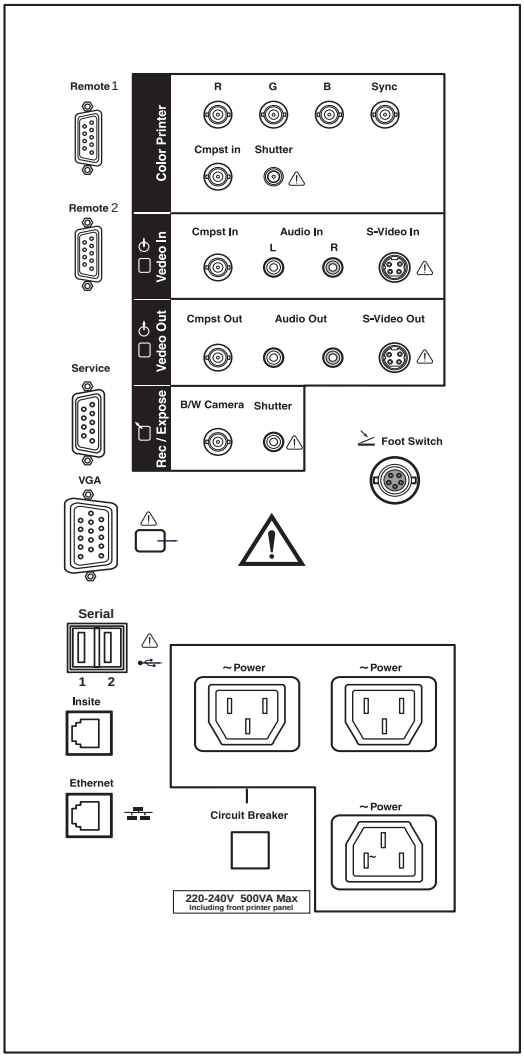

Figure 3-21 Rear Connector Panel

NOTE: Each outer (case) ground line of peripheral/accessory connectors are protectively grounded. Signal ground lines are not isolated, except the Service port (3). All of signal lines (include signal GND) of the Service port are isolated.

3-6-4-1 External I/O Pin Outs

Pin No.	Signal	Pin No.	Signal
1	N/A	6	DSR
2	RXD	7	RTS
3	TXD	8	GTS
4	DTR	9	N/A
5	GND		

Table 3-6 Pin Assignments of RS232C for Remote 1 and Remote 2

Pin No.	Signal	Pin No.	Signal
1	NC	6	NC
2	RXD	7	NC
3	TXD	8	NC
4	NC	9	RI
5	GND		

Table 3-7 Pin Assignments of RS232C for Service

Pin No.	Signal	Pin No.	Signal
1	RED	9	N/A
2	GREEN	10	SGND
3	BLUE	11	N/A
4	N/A	12	N/A
5	GND	13	HSYNC
6	RGND	14	VSYNC
7	GGND	15	N/A
8	BGND		

Table 3-8 Pin Assignments of DB15 connector for External VGA

3-6-4-1 External I/O Pin Outs (cont'd)

Pin No.	Signal	Pin No.	Signal
1	+5 VDC	3	DATA +
2	DATA -	4	GND

Table 3-9 Pin Assignments of USB

Pin No.	Signal	Pin No.	Signal
1	TX+	5	NC
2	TX-	6	RX-
3	RX+	7	NC
4	NC	8	NC

Table 3-10 Pin Assignments of InSite - RJ45 Male Connector

Pin No.	Signal	Pin No.	Signal
1	TX+	5	NC
2	TX-	6	RX-
3	RX+	7	NC
4	NC	8	NC

Table 3-11 Pin Assignments of Ethernet

Pin No.	Output Signal
1	PRINT*1
2	Signal GND

Table 3-12 Pin Assignment of Mini-Jack for Controlling B/W Printer

Pin No.	Output Signal
1	SHUTTER*2
2	Signal GND

Table 3-13 Pin Assignment of Mini-Jack for Controlling Color

3-6-5 Video Specification

Video specifications may be needed to be able to connect laser cameras or other devices to the LOGIQ™ 5.

Table 3-14 Video Specifications

Timing Parameter	1024x768 75Hz	768x576 50Hz	640x480 60Hz	800x600 60Hz	800x600 75Hz	1024x768 60Hz
Horizontal Rate [kHz]	60.02	31.25	31.47	37.88	46.88	48.36
Horizontal Period [µs]	16.66	32.00	31.78	26.40	21.33	20.68
Pixel Clock [MHz]	78.75	29.50	24.55	40.00	49.50	65.00
H Blank Width [µs]	3.66	5.97	5.70	6.40	5.17	4.92
H Sync Width [µs]	1.22	2.34	2.36	3.20	1.62	2.09
H Front Porch [µs]	0.20	0.75	0.73	1.00	0.32	0.37
Active Horizontal Period [µs]	13.00	26.03	26.07	20.00	16.16	15.75
Vertical Rate [Hz]	75.03	50.00	59.94	60.32	75.00	60.00
Vertical Period [ms]	13.33	20.00	16.68	16.58	13.33	16.67
V Sync Width [lines=ms]	32=0.53	49=1.57	45=1.43	28=0.74	25=0.53	38=0.79
V Front Porch [lines=µs]	3=50.00	5=160.00	6=190.70	4=105.60	3=64.00	6=124.10
Equalization Gate [lines=µs]	1=16.66	5=160.0	6=190.7	1=26.4	1=21.3	3=62.00
Lines: Field/Frame	800	625/625	525/525	628	625	806
Active Lines/Frame	768	576	480	600	600	768

Section 3-7
Available Probes

See Specifications in the LOGIQ™ 5 User Reference Manual for probes and intended use.

See ***Chapter 9***, for part numbers to be used when ordering new or replacement probes.

Section 3-8
Software/Option Configuration

Refer to the LOGIQ™ 5 Basic User Manual, Chapter 16, Customizing Your System for information on configuring items like Hospital, Department, Language, Units (of measure), Date, Time and Date Format.

For information on configuring Software Options, Refer to the LOGIQ™ 5 Basic User Manual, Chapter 16, Customizing Your System.

For information on configuring DICOM Connectivity, Refer to the LOGIQ™ 5 Basic User Manual, Chapter 16, Customizing Your System.

Section 3-9
Connectivity Installation Worksheet

Site System Information

Site:

Dept:

LOGIQ SN: Type:

Floor:

Room:

REV:

Comments:

CONTACT INFORMATION

Name	Title	Phone	E-Mail Address

TCP/IP Settings

Name - AE Title:

IP Settings

IP Address:

Subnet Mask:

Default Gateway:

Remote Archive Setup

Remote Archive IP:

Remote Archive Name:

Services (Destination Devices)

	Device Type	Manufacturer	Name	IP Address	Port	AE Title
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						

Section 3-10
Loading Base System Software

3-10-1 Loading Base system Software

For more information on loading base system software, refer to Section 8-10 "Software Loading Procedure" on page 8-166.

Section 3-11
System Setup

3-11-1 System Setup

For more information on System setup, refer to Section 8-11 "Installing Base Software Load Image" on page 8-178.

Section 3-12
Paperwork

NOTE: During and after installation, the documentation (i.e. User Manuals, Installation Manuals...) for the peripheral units must be kept as part of the original system documentation. This will ensure that all relevant safety and user information is available during the operation and service of the complete system.

3-12-1 Product Locator Installation

NOTE: The Product Locator Installation Card shown may not be same as the provided Product Locator card.

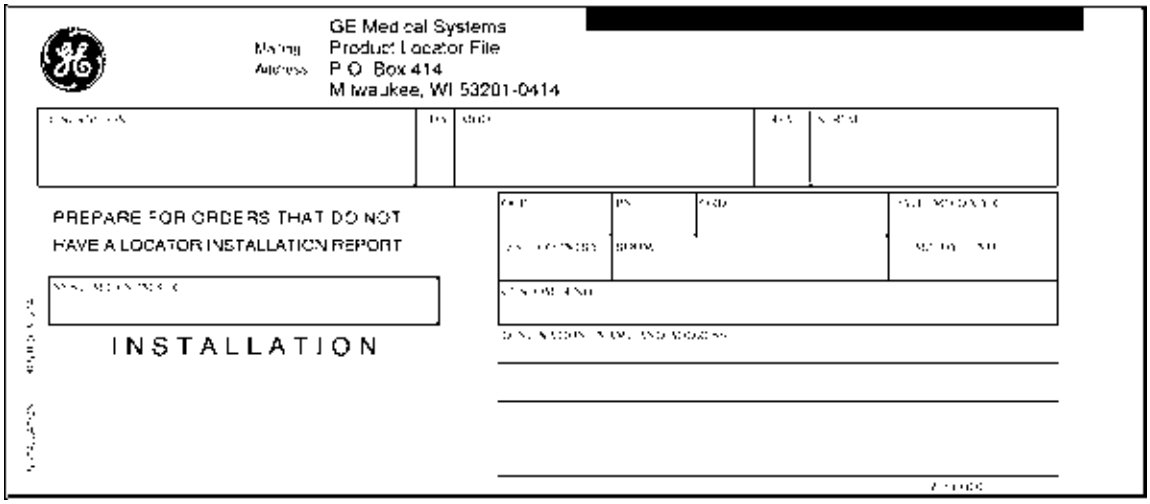

Figure 3-22 Product Locator Installation Card

3-12-2 User Manual(s)

User Check that the correct User Manual(s) for the system and software revision, is included with the installation. Specific language versions of the User Manual may also be available. Check with your GE Sales Representative for availability.

3-12-2-1 Reference off-board peripherals and options

None.

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Chapter 4
Functional Checks

Section 4-1
Overview

4-1-1 Purpose of Chapter 4

This chapter provides procedures for quickly checking major functions of the LOGIQ™ 5 scanner diagnostics by using the built-in service software, and power supply adjustments.\

Table 4-1 Contents in Chapter 4

Section	Description	Page Number
4-1	Overview	4-1
4-2	Required Equipment	4-1
4-3	General Procedure	4-2
4-4	Software Configuration Checks	4-21
4-5	Peripheral Checks	4-22
4-6	Monitor Function Checks	4-23
4-7	Keyboard Function Checks	4-25
4-8	Mechanical Function Checks	4-34
4-9	Board Function Checks	4-41
4-10	Site Log	4-55

Section 4-2
Required Equipment

- An empty (blank) CD-R Disk.
- At least one transducer. See “Probe/Connectors Usage” on page 4-12. for an overview. (normally you should check all the transducers used on the system.)

Section 4-3
General Procedure

CAUTION **SYSTEM REQUIRES ALL COVERS**
Operate this unit only when all board covers and frame panels are securely in place. The covers are required for safe operation, good system performance and cooling purposes.

NOTICE Lockout/Tagout Requirements (For USA only)

Follow OSHA Lockout/Tagout requirements by ensuring you are in total control of the Power Cable on the system.

4-3-1 Power On/Boot Up

NOTE: After turning off the system, wait at least ten seconds before turning it on again. The system may not be able to boot if power is recycled too quickly.

4-3-1-1 Scanner Power On

1.) Connect the Main Power Cable to the back of the System.
2.) Ensure the Cable Clip slips securely over the shoulders on the molded plug.
3.) Connect the Main Power cable to an appropriate mains power outlet.
4.) Switch ON the Main Circuit Breaker at the rear of the System.

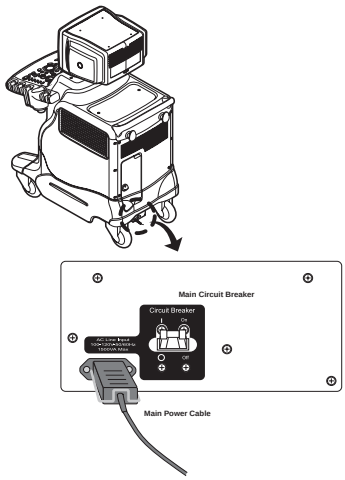

Figure 4-1 Circuit Breaker

When power is applied to the Scanner, and the Rear Circuit breaker is turned ON, Power is distributed to the JPC assy in AC power assy and BEP. When the power on/off switch is pressed once, DC power is turned on and distributed to the Fans, Monitor, Nest boards, peripherals.

4-3-1-1 Scanner Power On (cont'd)

5.) Press the **ON/OFF** key at the front of the System once.

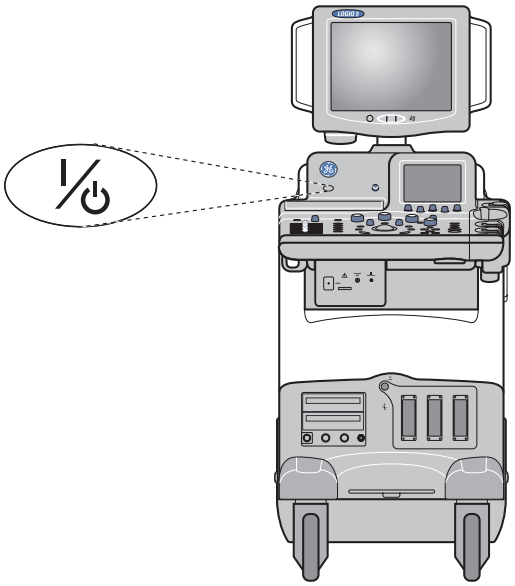

Figure 4-2 Power On/Off Standby Switch Location

4-3-2 Power Off / Shutdown

NOTE: After turning off a system, wait at least ten seconds before turning it on again. The system may not be able to boot if power is recycled too quickly.

4-3-2-1 Scanner Shutdown

1.) Press the On/Off **Key at the front of the System** once to display the SYSTEM - EXIT menu.

2.) Select Shutdown from the SYSTEM - EXIT menu.

Figure 4-3 System Exit Menu for Power Down

4-3-2-2 Switch off the System

1.) Switch OFF the Circuit Breaker at the back of the scanner.

2.) Disconnect the Mains Power Cable is necessary. *For example:* Servicing or relocating the scanner.

NOTICE Disconnecting the Mains Power Cable *before* switching OFF the Circuit Breaker will activate the uninterruptible power system (UPS) in the Back End Processor, forcing an ordered shutdown of the system.

4-3-3 System Features

4-3-3-1 Control Panel

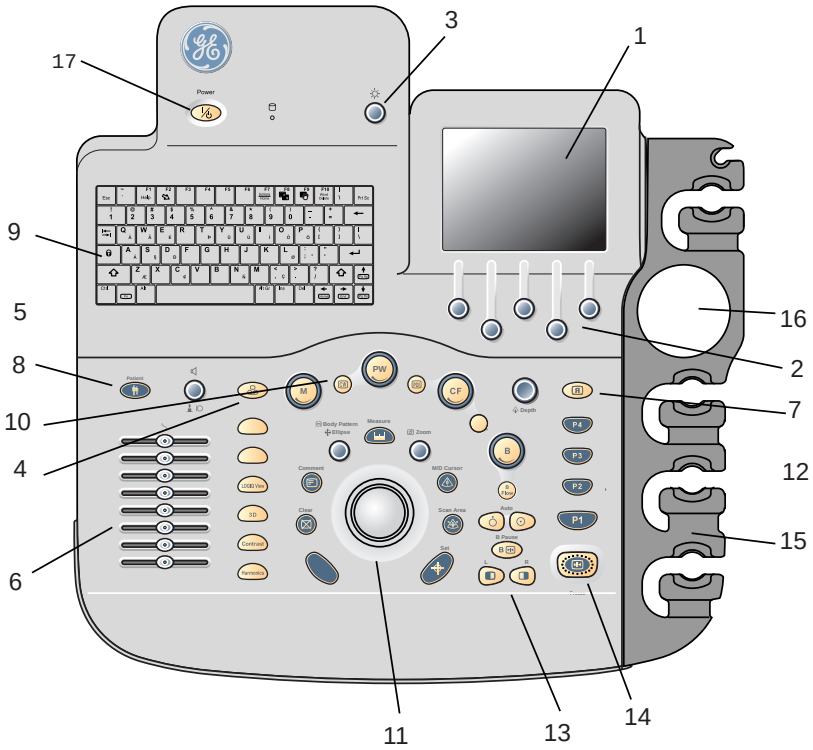

Figure 4-4 Control Panel Tour

1.) Touch Panel and Controls
2.) Additional Touch Panel and Controls
3.) Touch Panel Brightness Control
4.) Video
5.) Audio On/Off and Volume
6.) TGC
7.) Reverse
8.) Patient Button
9.) Alphanumeric Keyboard

4-3-3-1 Control Panel (cont'd)

10.) Mode/Gain Keys
11.) Imaging/Measurement Keys
12.) Depth
13.) Imaging Feature Keys
14.) Freeze and Print Keys
15.) Probe and Cord Holder
16.) Gel Holder
17.) Power Button

4-3-3-2 Power On/Off Switch**Touch Panel**

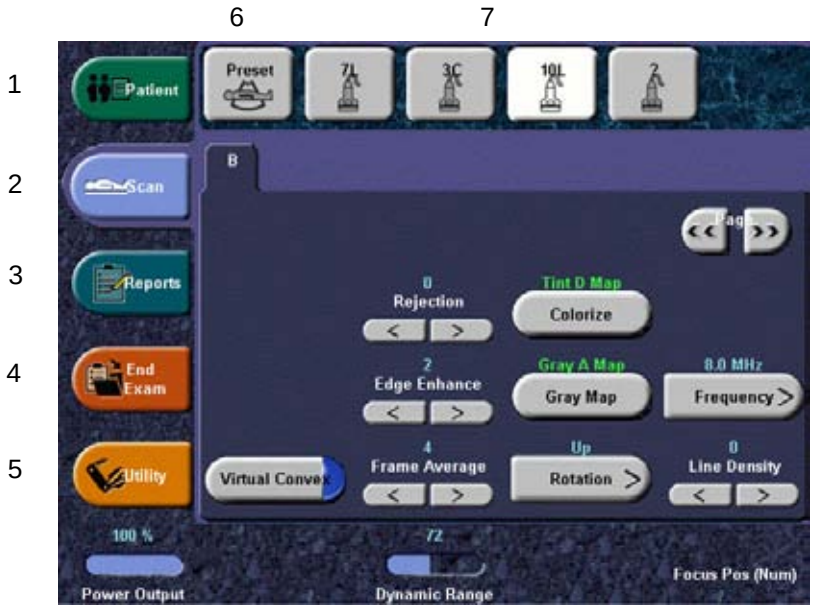

Figure 4-5 Touch Panel Display Tour

1.) Patient: Enter Patient screen
2.) Scan: Enter scanning mode screen
3.) Reports: Activates default report and Touch Panel of report choices.
4.) End Exam: Activates Image Management and Touch Panel with end of exam options.
5.) Utility: Activates the configuration system.
6.) Preset: Select the application to use.
7.) Probe Indicator: Indicates and selects the probes.

NOTE: Different menus are displayed depending on which Touch Panel Menu is selected.

At the bottom of the Touch Panel, there are five combination rotary dials/push buttons. The functionality of these rotaries changes, depending upon the currently displayed menu. Press the button to switch between controls (as with Focus Position/Number), or rotate the dial to adjust the value.

4-3-3-3 Monitor Display

Figure 4-6 Monitor Display Tour

Table 4-2 Monitor Display Features

1. Institution/Hospital Name, Date, Time, Operator Identification	2. Probe Identifier, Exam Study
3. Patient Name, Patient Identification	4. GE Symbol : Probe Orientation Marker. Coincides with a probe orientation marking on the probe.
5. Image Preview	6. Gray/Color Bar
7. Cine Guage	8. Measurement selection Menu
9. Image	10. Measurement
11. Result window	12. Imaging Paramenters by mode
13. Power Output Readout, system status	14. Focal Zone
15. Depth Scale	16. Body Pattern
17. TGC	18. Image Management Menu : Menu, Delete, and Image Manager
19. Image Palette	20. System Messages Display
21. System Messages Display	22. Trackball Fucntionality Status

4-3-4 System B/M-Mode Checks

For a basic functional check of the system's different modes, the Quick Guide will familiarize you with image optimization for **B-Mode**, **M-Mode**, **Color Flow**, and **Doppler**.

Figure 4-7 System B/M-Mode Checks

Table 4-3 B/M-Mode Functions

Power Output (Acoustic Power)	Optimizes image quality and allows user to reduce beam intensity. 10% increments between 0-100%. Values greater than 0.1 are displayed
Dynamic Range	Dynamic Range controls how echo intensities are converted to shades of gray, thereby increasing the adjustable range of contrast.
Focus Number and Position	Increases the number of transmit focal zones or moves the focal zone(s) so that you can tighten up the beam for a specific area. A graphic caret corresponding to the focal zone position(s) appears on the right edge of the image.
Rejection	Selects a level below which echoes will not be amplified (an echo must have a certain minimum amplitude before it will be processed).
Edge Enhance	Edge Enhance brings out subtle tissue differences and boundaries by enhancing the gray scale differences corresponding to the edges of structures. Adjustments to M Mode's edge enhancement affects the M Mode only.
Frame Average	Temporal filter that averages frames together. This has the effect of presenting a smoother, softer image.
Colorize	Enables gray scale image colorization. To deactivate, reselect a Gray Map.
Gray Map	Determines how the echo intensity levels received are presented as shades of gray.
Rotation (Up/Down)	Rotates the image by selecting the value from the pop up menu.
Frequency	Multi Frequency mode lets you downshift to the probe's next lower frequency or shift up to a higher frequency.
Frame Rate/Resolution	Optimizes B Mode frame rate or spatial resolution for the best possible image.

Table 4-3 B/M-Mode Functions

B Flow	Provides intuitive representation of non-quantitative hemodynamics in vascular structures.
Sensitivity/PRI	Adjusts the sample rate for the flow signal.
Background On/Off	Background On lets you view the anatomy roadmap; Background Off lets you view just flow information.
Sweep Speed	Changes the speed at which the timeline is swept.

4-3-5 System CFM and PWD Checks

Figure 4-8 CFM and PWD Functions

Table 4-4 CFM and PWD Functions

Baseline	Adjusts the baseline to accommodate faster or slower blood flows to eliminate aliasing.
PRF/Wall Filter	Velocity scale determines pulse repetition frequency. If the sample volume gate range exceeds single gate PRF capability, the system automatically switches to high PRF mode. Multiple gates appear, and HPRF is indicated on the display.
Angle Correct	Estimates the flow velocity in a direction at an angle to the Doppler vector by computing the angle between the Doppler vector and the flow to be measured
Threshold	Threshold assigns the gray scale level at which color information stops.
Map	Allows a specific color map to be selected. After a selection has been made, the color bar displays the resultant map.
Invert	Allows blood flow to be viewed from a different perspective, i.e. red away (negative velocities) and blue toward (positive velocities). The real-time or frozen image can be inverted.
Packet Size	Controls the number of samples gathered for a single color flow vector.
Quick Angle Correct	Quickly adjusts the angle by 60 degrees
Doppler Display Formats	Display layout can be preset to have B-Mode and Time-motion side-by-side or over-under. In the side-by-side layout, there are three display alternatives defined: equal priority, time-motion priority or time-motion with B-Mode reference. In the over-under layout, there are three display alternatives defined: time-motion priority, B Mode priority or equal priority.
Sample Volume Gate Length	Sizes the sample volume gate
Scan Area	Slants the B-Mode or Color Flow linear image left or right to get more information without moving the probe

4-3-6 Basic Measurements

*NOTE: The following instructions assume that you first scan the patient and then press **Freeze**.*

4-3-6-1 Distance and Tissue Depth Measurements

1.) Press **MEASURE** once; an active caliper displays.
2.) To position the active caliper at the start point (distance) or the most anterior point (tissue depth), move the **TRACKBALL**.
3.) To fix the start point, press ***Set***. The system fixes the first caliper and displays a second active caliper.
4.) To position the second active caliper at the end point (distance) or the most posterior point (tissue depth), move the **TRACKBALL**.
5.) To complete the measurement, press **SET**. The system displays the distance or tissue depth value in the measurement results window.

Before you complete a measurement:

To toggle between active calipers, press **MEASURE**.

To erase the second caliper and the current data measured and start the measurement again, press **CLEAR** once.

*NOTE: To rotate through and activate previously fixed calipers, turn **CURSOR SELECT**.*

*NOTE: After you complete the measurement, to erase all data that has been measured to this point, but not data entered onto worksheets, press **CLEAR**.*

4-3-6-2 Circumference/Area (Ellipse) Measurement

1.) Press **MEASURE** once; an active caliper displays.
2.) To position the active caliper, move the **TRACKBALL**.
3.) To fix the start point, press **SET**. The system fixes the first caliper and displays a second active caliper.
4.) To position the second caliper, move the **TRACKBALL**.
5.) Turn the **ELLIPSE** control; an ellipse with an initial circle shape appears.

NOTE: Be careful not to press the Ellipse control as this activates the Body Pattern.

6.) To position the ellipse and to size the measured axes (move the calipers), move the **TRACKBALL**.
7.) To increase the size, turn the **ELLIPSE** control in a clockwise direction. To decrease the size, turn the **ELLIPSE** control in a counterclockwise direction.
8.) To toggle between active calipers, press **MEASURE**.
9.) To complete the measurement, press **SET**. The system displays the circumference and area in the measurement results window.

Before you complete a measurement:

- To erase the ellipse and the current data measured, press **CLEAR** once. The original caliper is displayed to restart the measurement.
- To exit the measurement function without completing the measurement, press **CLEAR** a second time.

4-3-6-3 Worksheets

Measurement/Calculation worksheets are available to display and edit measurements and calculations. There are generic worksheets as well as Application specific worksheets. The worksheets are selected from the Measurement Touch Panel.

4-3-6-4 Report Pages

Measurements/Calculations that are included on the worksheet can also be displayed on Report Pages. Report Pages can be customized to meet the appropriate needs of the user.

4-3-7 Probe/Connectors Usage

4-3-7-1 Connecting a probe

1.) Place the probe's carrying case on a stable surface and open the case.
2.) Carefully remove the probe and unwrap the probe cable.
3.) DO NOT allow the probe head to hang free. Impact to the probe head could result in irreparable damage.
4.) Turn the connector locking handle counterclockwise.
5.) Align the connector with the probe port and carefully push into place.
6.) Turn the connector locking handle clockwise to secure the probe connector.
7.) Carefully position the probe cable in the probe cord holder spot so it is free to move, but not resting on the floor.

4-3-7-2 Activating the probe

Select the appropriate probe from the probe indicators on the Touch Panel.

The probe activates in the currently-selected operating mode. The probe's default settings for the mode and selected exam are used automatically.

4-3-7-3 Deactivating the probe

When deactivating the probe, the probe is automatically placed in standby mode.

1.) Press the ***Freeze*** key.
2.) Gently wipe the excess gel from the face of the probe. (Refer to the Basic User Manual for complete probe cleaning instructions.)
3.) Carefully slide the probe around the right side of the keyboard, toward the probe holder. Ensure that the probe is placed gently in the probe holder.

4-3-7-4 Disconnecting the probe

Probes can be disconnected at any time. However, the probe should not be selected as the active probe.

1.) Move the probe locking handle counterclockwise. Pull the probe and connector straight out of the probe port.
2.) Carefully slide the probe and connector away from the probe port and around the right side of the keyboard. Ensure the cable is free.
3.) Be sure that the probe head is clean before placing the probe in its storage box.

4-3-8 Using Cine

4-3-8-1 Activating CINE

Press **FREEZE**, then roll the **TRACKBALL** to activate CINE. To start CINE Loop playback, press Run/Stop. To stop CINE Loop playback. press Run/Stop.

4-3-8-2 Quickly Move to Start/End Frame

Press FIRST to move to the first CINE frame; press LAST to move to the last CINE frame.

4-3-8-3 Start Frame/End Frame

Turn the **START FRAME** dial to the left to move to the beginning of the CINE Loop. Turn the dial to the right to move forward through the CINE Loop.

Turn the **END FRAME** dial to the right to move to the end of the CINE Loop. Turn the dial to the left to move backward through the CINE Loop.

4-3-8-4 Adjusting the CINE Loop Playback Speed

Turn the **LOOP SPEED** dial right/left to increase/decrease the CINE Loop playback speed.

4-3-8-5 Disconnecting B-Mode CINE from Timeline CINE

To review the B-Mode CINE Loop only, press CINE MODE SELECTION and select B ONLY.

To review the Timeline CINE Loop only, press CINE MODE SELECTION and select TL ONLY.

To return to linked B-Mode and Timeline CINE Loop review, press CINE MODE SELECTION and select B/TL.

4-3-8-6 Moving through a CINE Loop Frame By Frame

Turn **FRAME BY FRAME** to move through CINE memory one frame at a time.

4-3-9 Image Management (QG)

For Image Management functionality refer to the LOGIQ™ 5 Quick Guide. It talks about several topics:

- Clipboard
- Printing Images
- Browsing and Managing an Exam's Stored Image
- Connectivity, and Dataflow Concept and Creation
- Starting an Exam
- Configuring Connectivity
- TCP/IP
- Services (Destinations)
- Buttons
- Views

Verifying and Pinging a Device

4-3-10 Using the CD-RW / MOD (Magneto-Optical Drive)

4-3-10-1 Using the CD-RW

NOTICE **Never move the unit with a disk in the CD-RW because the drive actuator will not be locked and the CD-RW could break.**

1.) Push the **EJECT** button, the disk tray will appear.
2.) Put the disk onto the disk tray.
3.) Press the **EJECT** button to insert the disk into the CD-RW device.
4.) There are a number of methods to eject a disk from the CD-RW. Ejection is automatic in some cases. Manual ejection methods, listed in preferred order of use, are:
   a.) Press **EJECT** button on the CD-RW while system is ON.
   b.) Press and hold **EJECT** button while the system is booting.
   c.) Mechanical ejection. Insert the end of a paper clip into the hole next to the EJECT button while system power is OFF.

NOTICE **Avoid mechanical ejection whenever possible. Mechanical ejection leaves the actuator unlocked and the MOD susceptible to damage if moved. If forced to use this method, reboot the system, then insert and eject a known good disk using one of the other methods.**

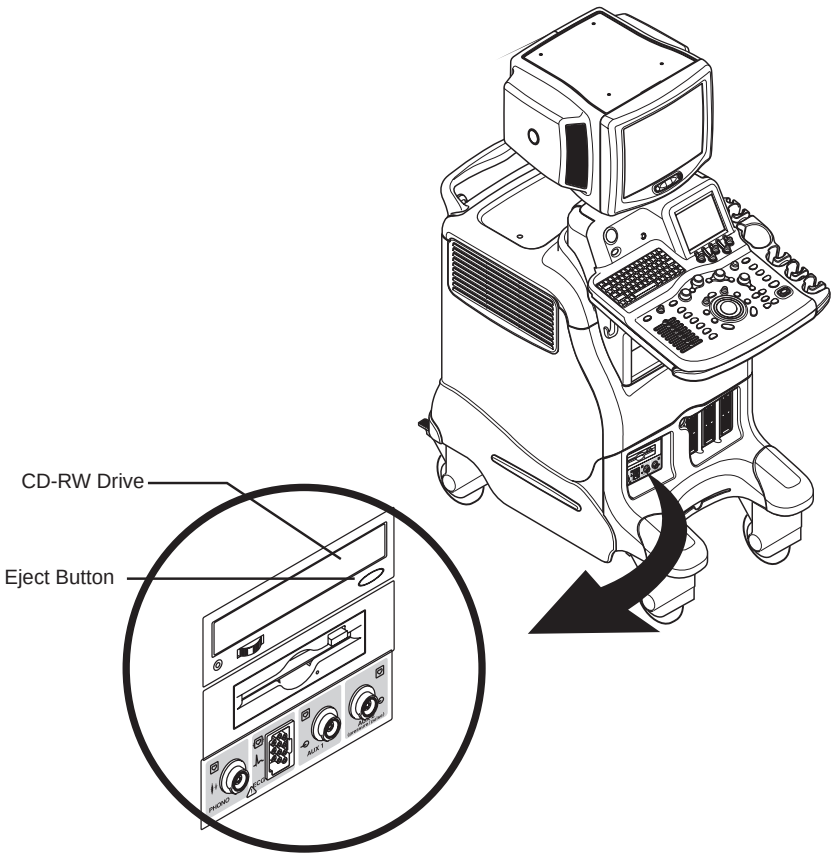

Figure 4-9 CD-RW drives

4-3-10-2 Using the MOD (Magneto-Optical Drive)

The 3.5 inch Magneto-Optical disk drive supports the following densities:

Standard: 640MB; 540MB; 230MB; and 128MB

Overwrite: 640MB; and 540MB

1.) Before installing an MO disk in the MOD, check the MO disk for loose hardware or damaged labels which could jam inside the MOD. Also, ensure that the slide switch in one corner of the disk is set so that the disk is write enabled (disk hole closed).

2.) Insert the disk into the MOD with the label facing up.

NOTICE **Never move the unit with a disk in the MOD because the drive actuator will not be locked and the MOD could break.**

3.) There are different methods to eject a disk from the MOD. In some cases disk ejection is automatic. Manual ejection methods are listed below in preferred order from best (1) to worst (4).

a.) When in Archive Menu, use the softkey choice –or– click Image Presets up, then click the left softkey switch up for ARCHIVE, then toggle the switch under EJECT MOD.

b.) Press the **EJECT** switch on the MOD while system is ON.

c.) Press and hold the **EJECT** switch while the system is booting.

d.) Mechanical ejection. Insert the end of a paper clip into the hole next to the **EJECT** switch while system power is OFF.

4-3-11 Backup and Restore Database, Preset Configurations and Images

NOTICE **Avoid mechanical ejection whenever possible. Mechanical ejection leaves the actuator unlocked and the MOD susceptible to damage if moved. If forced to use this method, reboot the system, then insert and eject a known good disk using one of the other manual ejection methods.**

4-3-11-1 Formatting Media

1.) To format the backup media, CD-ROM or MOD, select the UTILITY tab on the Touch Panel.
2.) Select CONNECTIVITY, then TOOLS(in case of BT05 SW, REMOVABLE MEDIA). Properly label and Insert the backup media.
3.) Select the media type from the drop down menu.
4.) Enter the label for the media as shown in Figure 4-10. It is best to use all capital letters with no spaces or punctuation marks.

Figure 4-10 Format and Verify Media

5.) The Ultrasound system displays a pop-up menu, as shown in Figure 4-11. When the formatting has been completed, press OK to continue.
6.) If desired, verify that the format was successful by returning to *Utility>Connectivity>Tools (in case of BT05 SW, Removable Media)* and selecting VERIFY as shown in Figure 4-10.

Figure 4-11 Format Successful Pop-up Menu

4-3-11-2 Backup System Presets and Configurations

NOTE: Always backup any preset configurations before a software reload. This ensures that if the presets need to be reloaded, after the software update, they will be the same ones the customer was using prior to service.

1.) Insert a formatted MOD (Magneto-Optical Disk) or CD-R into the drive.
2.) On the Touch Panel, press UTILITY.
3.) On the Utility Touch Panel, press SYSTEM.
4.) On the monitor display, select BACKUP/RESTORE.

NOTE: If you are not logged in as GE Service or with administrator privileges, the Operator Login window is displayed. Log on with administrator privileges.

5.) In the Backup list, select Patient Archive, Report Archive, System Configuration and User Defined Configuration.
6.) In the Media field, select MO or CD-RW.
7.) Select BACKUP.

The system performs the backup. As it proceeds, status information is displayed on the Backup/Restore screen.

Check here to backup presets and configurations

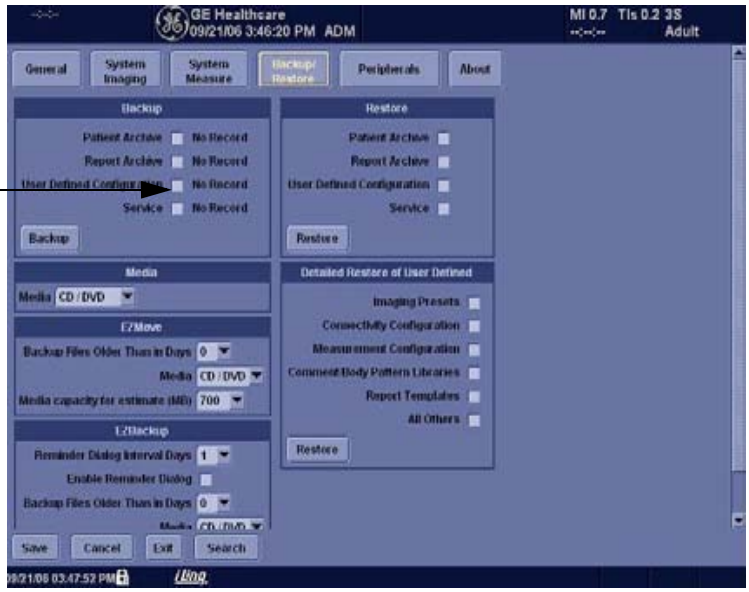

Figure 4-12 Backup/Restore Menu

4-3-11-3 Restore System Presets and Configurations

CAUTION The restore procedure **overwrites** the existing database on the local hard drive. Make sure to insert the correct MOD or CD-R.

1.) Insert the Backup/Restore MOD (Magneto-Optical Disk) or CD-R into the drive.
2.) On the Touch Panel, press UTILITY.
3.) On the Utility Touch Panel, press SYSTEM.
4.) On the monitor display, select BACKUP/RESTORE.

NOTE: If you are not logged in with administrator privileges, the Operator Login window is displayed. Log on with administrator privileges.

5.) In the Restore list, select Patient Archive, Report Archive, System Configuration and User Defined Configuration.
6.) In the Media field, select the Backup/Restore MOD or CD-RW.
7.) Select RESTORE.

The system performs the restore. As it proceeds, status information is displayed on the Backup/Restore screen.

Figure 4-13 Backup/Restore Menu

4-3-11-4 Archiving Images

To export an exam(s) to a compatible Ultrasound system:

1.) Format the removable media (MOD or CD-ROM). Label the removable media. Answer Yes/OK to the messages.Press Patient. Deselect any selected patient(s) in the search portion of the Patient screen. Press Exam Data Transfer (located at the upper, left-hand corner of the Patient menu).

Figure 4-14 Exam Data Transfer

2.) Select Export task Button.

Figure 4-15 Task button

3.) The [From] combo box is not active. It displays Local Archive. The [To] combo box is active. Select the type of removable media MOD or CD Rom. Then please wait until the patient list is visible.

Figure 4-16 To Combo Box

4-3-11-4 Archiving Images (cont'd)

4.) In the patient list at the top of the Patient menu, select the patient(s) you want to export. You can use Windows commands to select more than one patient. To select a consecutive list of patients, click the cursor on the first name, move the cursor to the last name, then press and hold down the Shift+right Set key to select all the names. To select a non-consecutive list of patients, click the cursor at the first name, move the cursor to the next name, then press and hold down the Ctrl+right Set key, move the cursor to the next name, then press and hold down the Ctrl+right Set key again, etc. You can also search for patients via the Search key and string. Or, Select All Button from the Patient Menu:

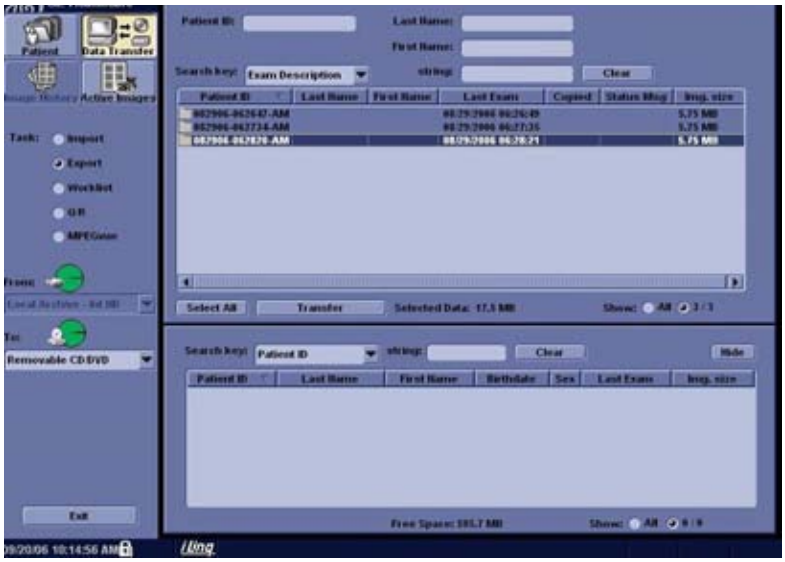

Figure 4-17 Source Section

NOTE: You need to use your best judgment when moving patients' images. If there are lots of images or loops, then only move a few patients at a time.

5.) Once you have selected all of the patients to export, press Transfer Button as shown in Figure 4-17 from the Patient Menu.

6.) The progress bar appears as the copy is taking place. Once transfer completed, the exported patient list will be shown as Figure 4-18.

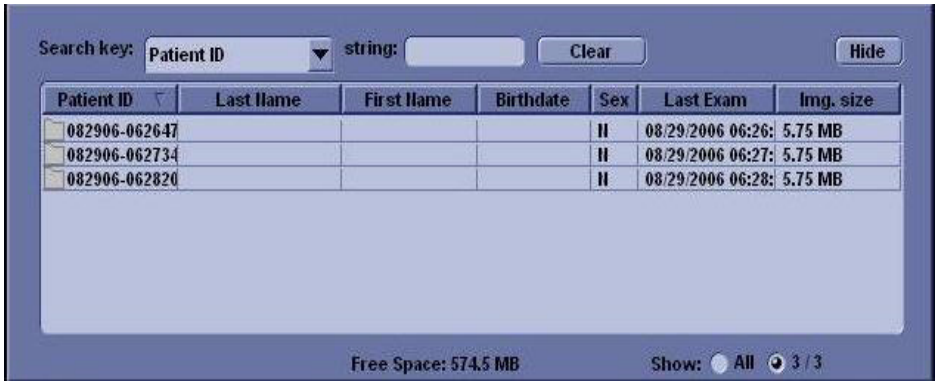

Figure 4-18 Destination Section of Patient Screen

7.) Press F3 to eject the media. Specify that you want to finalize the CD-ROM.

4-3-12 ECG Check Out (this option is currently not available on the LOGIQ™ 5

Connect the ECG Harness and check:

Table 4-5 ECG Harness Check

Step	Task to do	Expected Result(s)
1.	Connect the ECG at the Connector on the Front of the scanner.	It will display a curve along the bottom edge of the image sector

Section 4-4
Software Configuration Checks

Table 4-6 Software Configuration Checks

Step	Task to do	Expected Result(s)
1.	Check Date and Time setting	Date and Time are correct
2.	Check that Location (Hospital Name) is correct	Location Name is correct
3.	Check Language settings	Desired Language is displayed
4.	Check assignment of Printer Keys	Print1-4 Keys are assigned as desired by the customer
5.	Check that all of the customer's options are set up correct	All authorized functions are enabled

Section 4-5
Peripheral Checks

Check that peripherals work as described below:

Table 4-7 Peripheral Checks

Step	Task to do	Expected Result(s)
1.	Press (**FREEZE**)	Stop image acquisition.
2.	Press (**PRINT 1**) or (**PRINT 2**) on the Control Panel	The image displayed on the screen is printed on B&W or Color printer, depending on the key assignment configuration
3.	Press **VIDEO** on the Control Panel.	To start the video counter at a different point:
4.	Press **UPDATE MENU** in the Trackball area.	The *Video Set Counter / Search Dialog window* is displayed
5.	Use the **alphanumeric keyboard** to enter the counter number in the counter field.	Number appears
6.	Press **SET COUNTER** to save the change.	Number is saved
7.	Press **VIDEO** on the Control Panel	to return to the scanning mode
8.	Press **REC/PAUSE** on the Control panel.	to Start Recording A red dot is displayed in the *VCR status area* on the *Title bar* to indicate that recording has begun
9.	Press **REC/PAUSE** on the Control panel.	To Stop recording The video status icon is changed to (Pause)
10.	Press VIDEO on the Control Panel and the assignable play	To start, Play back an examination
11.	Use the **Assignable keys** on the *Control Panel*	to perform actions on the recorded session, such as stop, pause, rewind or fast forward. The video status icon in updated accordingly.
12.	While in playback mode, use the **TRACKBALL** to adjust the video playback speed and scroll through the record.	To search on the tape
13.	Press the assignable **PAUSE**	to stop the tape at the desired frame.
14.	When playing back an examination	part of it can be stored on the computer's memory as a cineloop.The cineloop enables the user to perform further operations on the stored section (see for further information on cineloop operation).
15.	Press (**FREEZE**) while playing back a recorded session.	**To store a recorded sequence as a cineloop. The** last few seconds are stored as a cineloop.

Section 4-6Monitor Function Checks

4-6-1 CRT Assy function check procedure

1.) Turn on the system and check the completion of Echoloader loading.

2.) Select "Utility Key" on the Key board and then choose " Test Pattern" and "Resolution" marked in Figure 4-19.

Figure 4-19 Monitor Test pattern screen

3.) All the Numbers from '0' to '100' on the Monitor Test pattern screen above should be easily distinguished.

4-6-2 Monitor Cable Assy function check procedure

1.) Turn on the system and check the completion of Echoloader loading.

2.) Select "Utility Key" on the Key board and then choose " Test Pattern" and "Resolution" marked in Figure 4-19.

3.) All the Numbers from '0' to '100' on the Monitor Test pattern screen above should be easily distinguished.

4-6-3 Monitor S/W Assy function check procedure

1.) Turn on the system and check the completion of Echoloader loading.

2.) Select "Utility Key" on the Key board and then choose " Test Pattern" and "Resolution" marked in Figure 4-19.

3.) All the Numbers from '0' to '100' on the Monitor Test pattern screen above should be easily distinguished.

4-6-4 Rear panel Assy function check procedure

1.) Turn on the system and check the completion of Echoloader loading.

2.) Refer to See “Peripheral Checks” on page 4-22.

3.) Refer to Section 5-7-2 - Peripherals and Cable connection on page 5-19.

Figure 4-20 Rear Panel

Section 4-7Keyboard Function Checks

4-7-1 Main Keyboard Assy validation

1.) Boot up the system.
2.) Insert the Service Dongle and go to the maintenance mode.
3.) Click 'Start' and go to 'Run' .

Figure 4-21 start and run

4.) Click the Run and then you can get the 'Run' dialog box.
5.) Write the 'cmd 'command into 'Run' dialog box and press 'OK' button to display command prompt.

Figure 4-22 Run dialog box

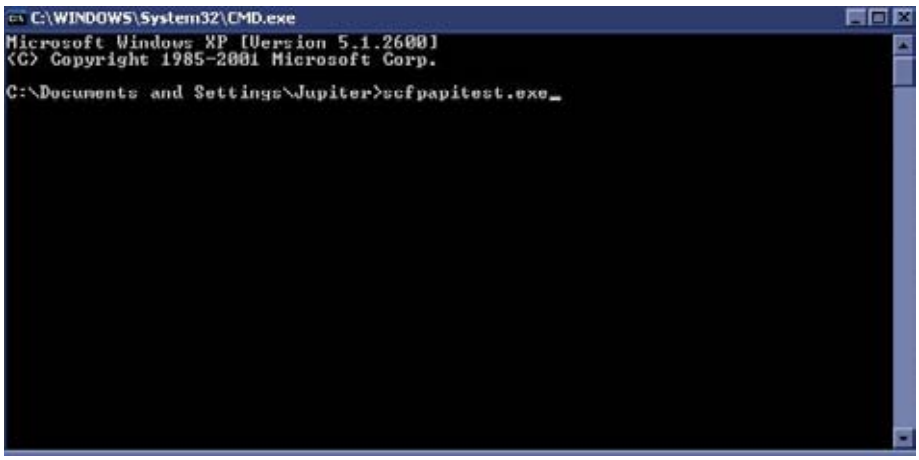

Figure 4-23 command prompt

4-7-1 Main Keyboard Assy validation (cont'd)

6.) Write the 'scfpapitest.exe' on the command prompt and press 'Enter' button to pop up the scfpapitest program.

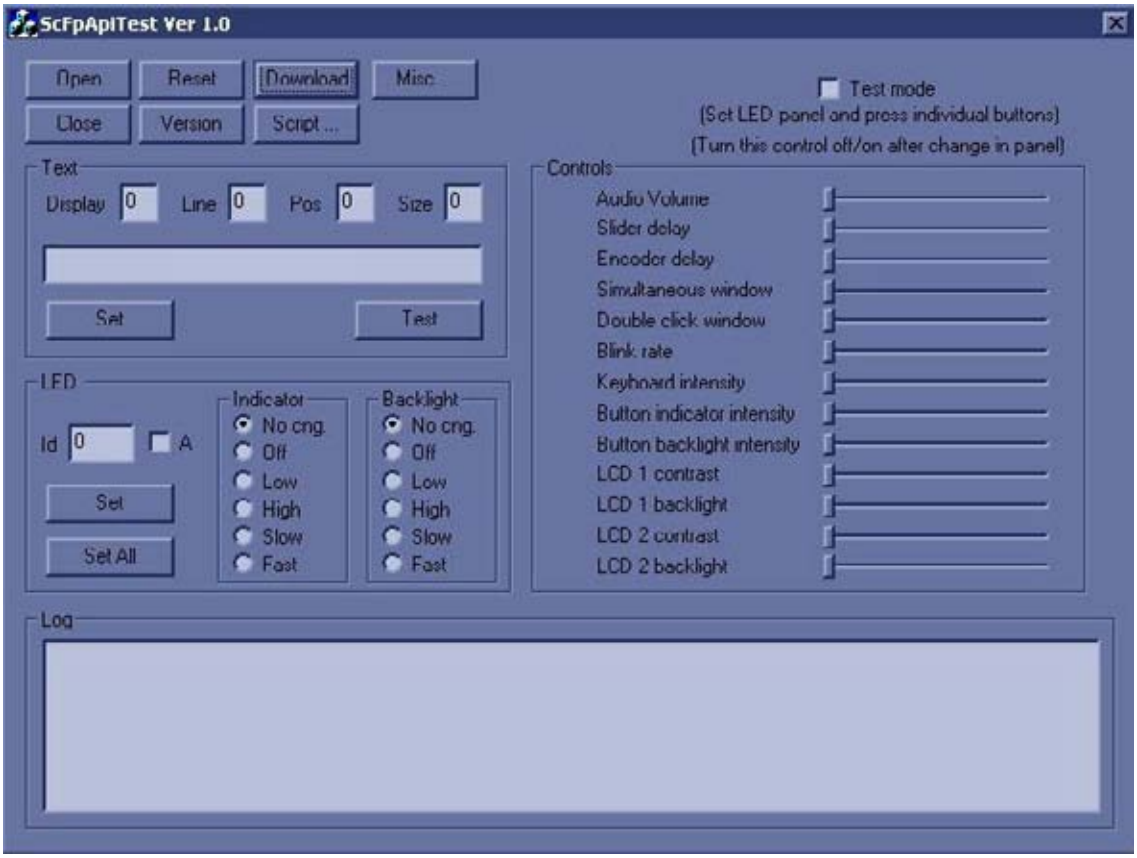

Figure 4-24 scfpapitest program

7.) Press the keyboard button and rotate rotary button. When you press or rotary keys, Log dialog box displays the key log. Button name and displaying log name is like the table.

Button or Rotary Name	The Name displayed in Log	Button or Rotary Name	The Name displayed in Log
Patient	New Patient Button	B pause	B Pause Button
Record	External Output or VCR button	Depth (Button)	Depth PushEncoder Button
Userdefine 1	Userdefine 1 Button	Depth (Rotary)	Depth PushEncoder Rotary
Userdefine 2	Userdefine 2 Button	B (Button)	B PushEncoder Button
Userdefine 3	Userdefine 3 Button	B (Rotary)	B PushEncoder Rotary
3D	3D Button	CF (Button)	CFM PushEncoder Button
Userdefine 4	Userdefine 4 Button	CF (Rotary)	CFM PushEncoder Rotary

Table 4-8 Button and Rotary table

Button or Rotary Name	The Name displayed in Log	Button or Rotary Name	The Name displayed in Log
Harmonic	Harmonics Button	PDI	PDI Button
Reverse	Reverse Button	PW (Button)	PWD PushEncoder Button
P1	Print or record button1	PW (Rotary)	PWD PushEncoder Rotary
P2	Print or record button2	CW	CW Button
P3	Print or record button3	M (Button)	M Mode PushEncoder Button
P4	Print or record button4	M (Rotary)	M Mode PushEncoder Rotary
L (Left)	Left Button	Measure	Measure Button
R (Right)	Right Button	B Flow	B Flow Button
BodyPattern/ Ellipse (Button)	BodyPattern/Ellipse PushEncoder Button	Comment	Comment Button
BodyPattern/ Ellipse (Rotary)	BodyPattern/Ellipse PushEncoder Rotary	Clear	Clear Button
Auto Right	Auto Right Button	TGC Slide	Slider : n=8 s1 ~ s8
Auto Left	Auto Left Button	Scan Area	ScanArea Button
Audio (Button)	Audio/Mic PushEncoder Button	Spare Button	Spare Button
Audio (Rotary)	Audio/Mic PushEncoder Rotary	M/D Cursor	MD Cursor Button
Zoom (Button)	Zoom/Size PushEncoder Button	Freeze	Freeze Button
Zoom (Rotary)	Zoom/Size PushEncoder Rotary		

Table 4-8 Button and Rotary table

NOTICE When you can check the name displayed in log as you press or rotate keys, the main keyboard assy was replaced correctly.

4-7-1 Main Keyboard Assy validation (cont'd)

8.) Check the 'Fast' radio button into Indicator box on scfpapitest program and press 'Set All' button.

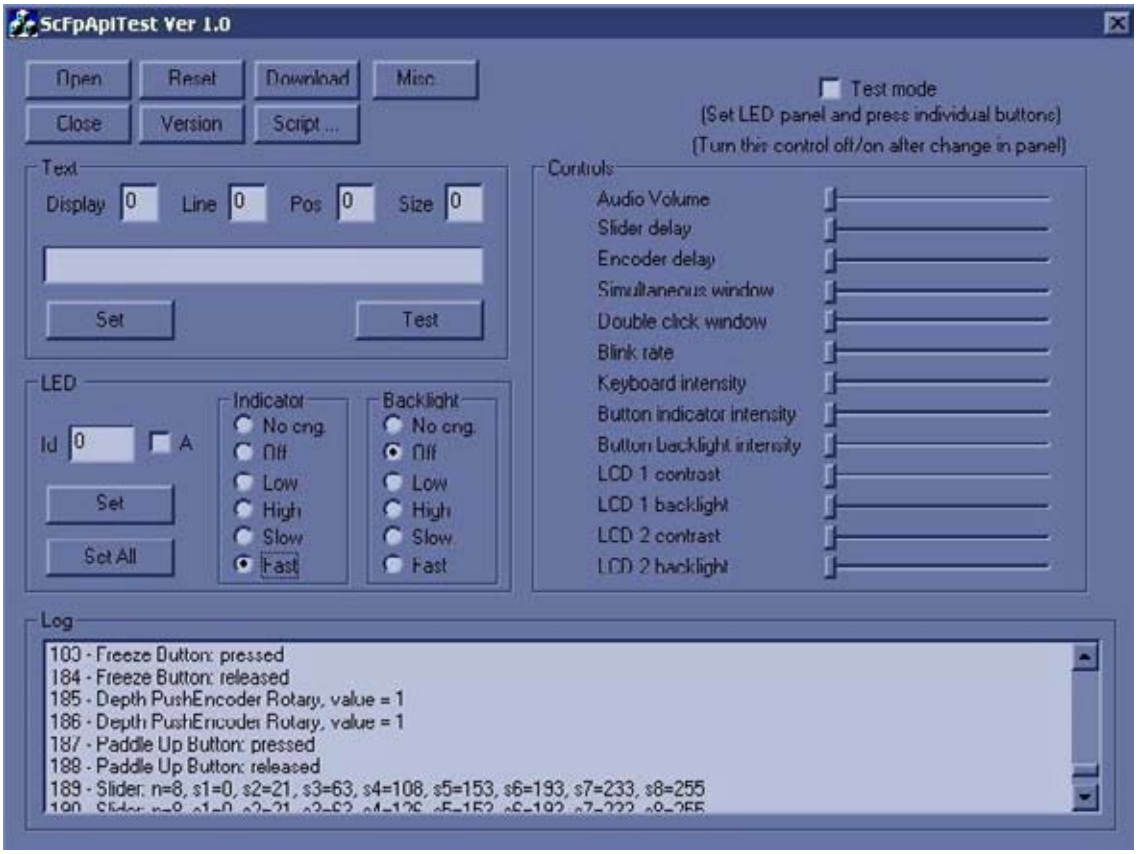

Figure 4-25 Fast button

⚠ **NOTICE** After pressing Fast radio button, indicators should be blanked on the frontpanel.

4-7-2 OP Panel Encoder Assy Validation

1.) Follow up the procedure 8-4-1 to run the scfpapitest program.
2.) Check the each Encoder in Table 4-8 on page 26.

NOTICE While rotating or pressing encoders, Encoder message should be displayed in Log of Scfpapitest.exe

4-7-3 OP Panel TGC Assay Validation

1.) Follow up the procedure section 4-7-1 on page 25 to run the scfpapitest program.
2.) Slide TGC pot and check up the value.

NOTICE While sliding TGC pot, TGC message should be displayed.

4-7-4 TGC Knob Set validation

1.) Follow up the procedure section 4-7-1 on page 25 to run the scfpapitest program.
2.) Slide TGC pot and check up the value.

NOTICE While sliding TGC pot, TGC message should be displayed.

4-7-5 A/N Key assy validation

1.) Boot up the system
2.) Press 'Comment' button
3.) Press A/N keyboard.

NOTICE Each key should be displayed on the monitor display.

4-7-6 Trackball Assy validation

1.) Boot up the system
2.) Press the measurement button.
3.) Move the Trackball

NOTICE When you move the trackball in measurement mode, the cursor should be moved.

4-7-7 OP Panel HUB Board Assy Validation

1.) Section 4-7-1 - Main Keyboard Assy validation on page 4-25 process.
2.) Section 4-7-5 - A/N Key assy validation on page 4-29 validation process.
3.) Section 4-7-6 - Trackball Assy validation on page 4-29 process.

NOTICE Main keyboard, A/N Keyboard and Trackball should be working.

4-7-8 OP Panel LCD Assy Validation

1.) Boot up the system.

2.) Follow up the process from step1 to step7 of Section 4-7-1.

3.) Touch the touchpanel.

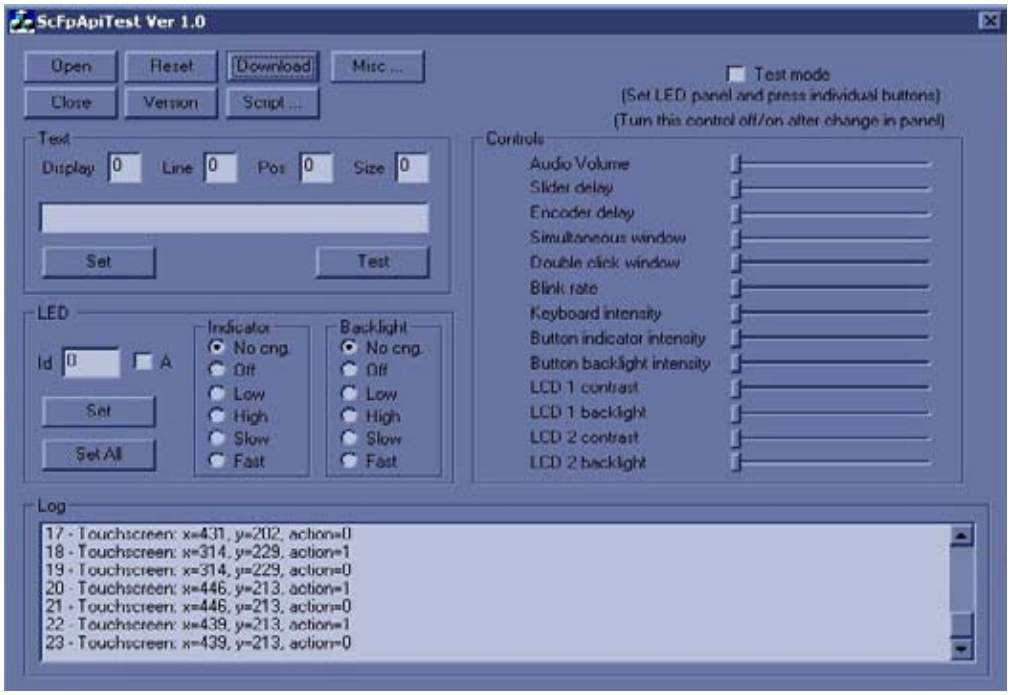

Figure 4-26 Touchpanel

NOTICE In case of touch point is displayed in log of scfpapitest.exe while you press the touchpanel, LCD assy is connected correctly.

4-7-9 OP Panel LCD Encoder Assy Validation

1.) Boot up the system and run the scfpapitest program.

NOTICE Follow up the procedure from step 1 to step 7 of Section 4-7-1 to run the scfpapitest program.

2.) Press and Rotary LCD Encoder.

3.) Check the log dialog box in scfpapitest program.

Button or Rotary Name	The Name displayed in Log
1 Button	PushEncoder 1 of Touchpanel Button
2 Button	PushEncoder 2 of Touchpanel Button
3 Button	PushEncoder 3 of Touchpanel Button
4 Button	PushEncoder 4 of Touchpanel Button
5 Button	PushEncoder 5 of Touchpanel Button
1 Rotary	PushEncoder 1 of Touchpanel Rotary
2 Rotary	PushEncoder 2 of Touchpanel Rotary
3 Rotary	PushEncoder 3 of Touchpanel Rotary
4 Rotary	PushEncoder 4 of Touchpanel Rotary
5 Rotary	PushEncoder 5 of Touchpanel Rotary
Brightness Rotary	Brightness PushEncoder Rotary

Table 4-9 Button and Rotary Table

NOTICE The Name displayed in log while rotating the rotary button, The menu Encoder is working correctly.

4-7-10 Speaker Assy Validation

1.) Boot up the system.

2.) Insert the Service Dongle and go to the maintenance mode.

3.) Move to trackball to the bottom of main monitor.

Figure 4-27 Maintenance display

4.) Double click the audio icon at the bottom of the display.

Figure 4-28 Open Volume Control

5.) Go and Click the Open Volume Control.

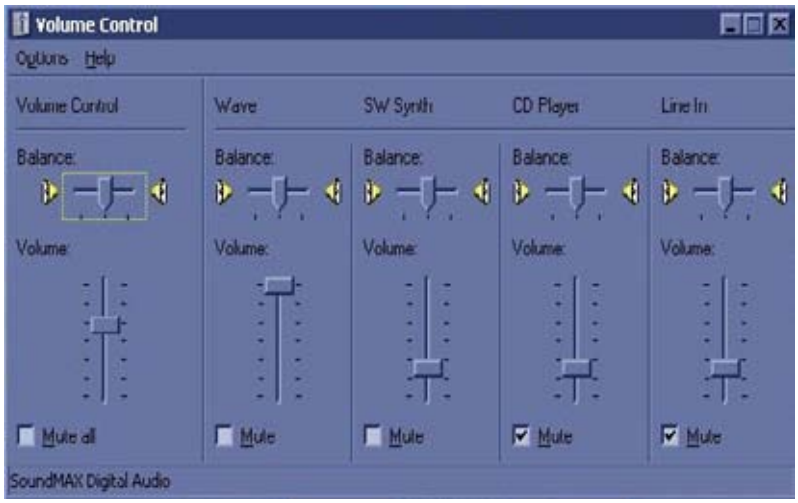

Figure 4-29 Volume Control panel

4-7-10 Speaker Assy Validation (cont'd)

6.) At the Balance in Volume Control, move the gauge to the max left.

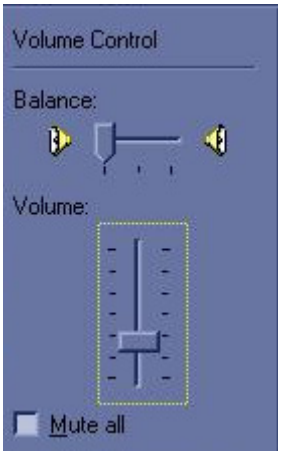

Figure 4-30 Volume control for left speaker

7.) Move the Volume gauge up and down.

NOTICE While moving the volume gauge, you can hear the audio sound only from Left speaker.

8.) At the Balance in Volume Control, move the gauge to the max right.

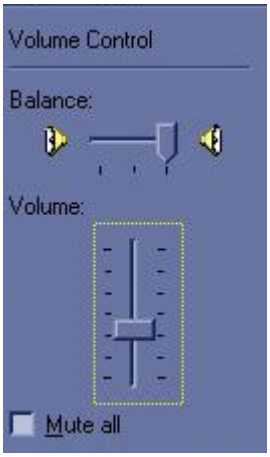

Figure 4-31 Volume control for right speaker

9.) Move the Volume gauge up and down.

NOTICE While moving the volume gauge, you can hear the audio sound only from Right speaker.

NOTICE When you can hear the audio sound at the left and right speaker, The speaker assy is connected correctly.

Section 4-8
Mechanical Function Checks

4-8-1 Operator I/O Movement

Table 4-10 Display platform Maneuverability check

Step	Task to do	Expected Result(s)
1.	Pull keyboard lever under the OP Panel to release the lock.	The height of the Monitor and OP Panel will be maneuverable.

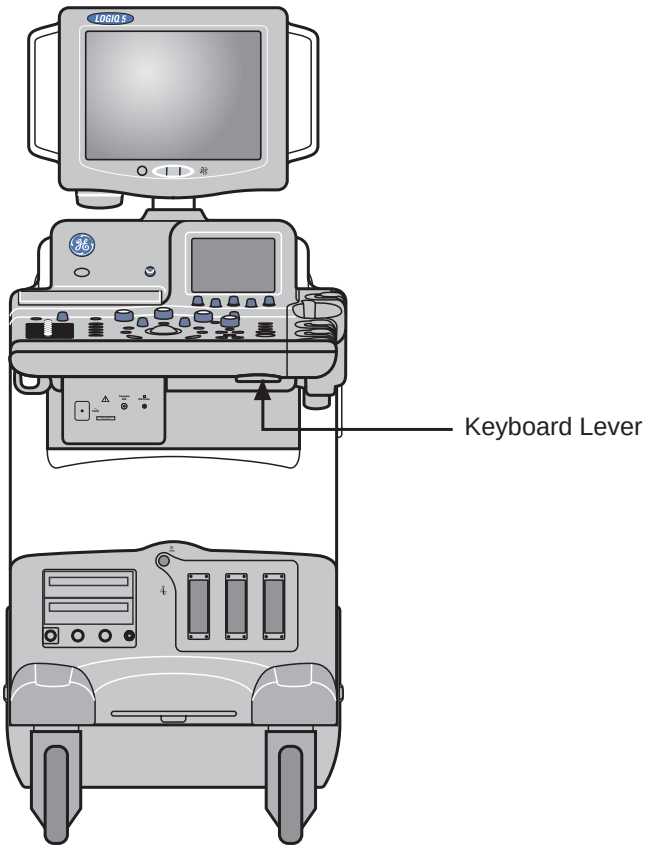

Figure 4-32 Keyboard Lever

WARNING ***Probes can be connected at any time, whether the unit is on or off***

Do NOT touch the patient and any of the connectors on the ultrasound unit simultaneously, including ultrasound probe connectors.

WARNING ***Take the following precautions with the probe cables: Keep free from the wheels. Do not bend.Do not cross cables between probes.***

4-8-2 Cover Parts Function Validation

Table 4-11 Cover parts of the FRU

No	Item
1	Right and Left cover
2	Front cover
3	Rear cover
4	Rear Door cover
5	Top cover
6	Front base cover
7	Front cover
8	OP Side L cover
9	OP Side R cover
10	OP Rear cover
11	OP Buttom cover
12	OP Curtain cover
13	EMI cover L
14	EMI cover R
15	Side cap
16	Side Fringe
17	Rear Handle
18	ECG cable hook
Function Check/Validation Category	
- Check if the FRU parts are assembled tightly by naked eye and hands. - Check if there are dents, scratches, or cracks on the FRU parts. - Check if screws are in place.	

4-8-2-1 Task Lamp Assy

Check if task lamp is operated.

Figure 4-33 Task Lamp Assy

4-8-2-2 Keyboard Front Grip

- Check if the keyboard front grip is fastened so that it won't move.
- Check if the keyboard front grip can not be removed easily.

Figure 4-34 Keyboard Front Grip

4-8-2-3 Probe holder

- Check if the probe holder is fastened so that it won't move.
- Check if the probe holder can not be removed easily.

Figure 4-35 Probe holder

4-8-2-4 Gas Spring Assy

Check if the up and down mechanism operates rightly.

Figure 4-36 Gas Spring Assy

4-8-2-5 Front caster/Rear caster

- Check caster locks for proper operation.
- Check caster's motion for proper operation.
- Check if screws are in place.

Figure 4-37 Front caster/Rear caster

4-8-2-6 Bumper Set

- Check if the bumper set is fastened so that it won't move.
- Check if the bumper set can not be removed easily.

Figure 4-38 Bumper Set

4-8-2-7 Air filter set

Check if the air filter set is placed deep inside.

Figure 4-39 Air filter set

4-8-2-8 OP Panel Encoder Assy, TGC Knob Set, OP Panel LCD Encoder Assy, Menu Encoder Assy

- Check if the each button operates properly.
- Check if encoder knobs are in the center.
- Check if the keycap set can not be removed easily.

Figure 4-40 Keyboard Assy

4-8-2-9 Monitor Cover Set

- Check if the FRU parts are assembled tightly by naked eye and hands.
- Check if there are dents, scratches, or cracks on the FRU parts.
- Check if screws are in place.
- Check if the each button of the monitor operates properly.

Figure 4-41 Monitor Cover Set

Section 4-9Board Function Checks

4-9-1 RLY Assy function check procedure

1.) Turn on the system

2.) After completion of echoloader loading, connect probe on port1. See “Connecting a probe” on page 4-12.

3.) Log into "Service Login". Refer to Section 5-10-2 - Global Service User Interface (GSUI) on page 5-33.

4.) Click "Diagnostics" on top menu.

5.) On left folder window, select 'LOGIQ 5 Diagnostics'=>'FRU test'=>'RLY'.

6.) Select 'RLY Full Test' and execute test.

7.) All diagnostic test items should be passed. Refer to the figure below.

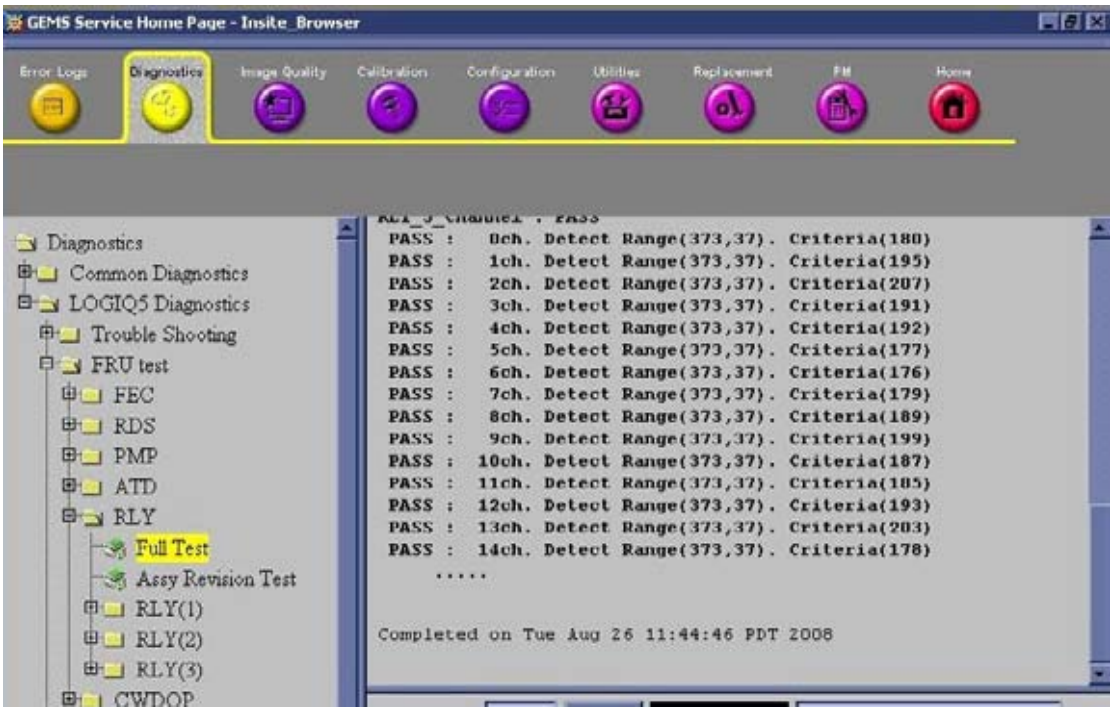

Figure 4-42 RLY diagnostic test

8.) Activate probe. Refer to Section 4-3-7-2 - Activating the probe on page 4-12.

9.) Check the system basic functions. Refer to Section 4-3-4 - System B/M-Mode Checks on page 4-7. Refer to Section 4-3-5 - System CFM and PWD Checks on page 4-9.

10.) Disconnect probe. Refer to Section 4-3-7-4 - Disconnecting the probe on page 4-12.

11.) Connect probe on port2 and repeat step 8) ~ 10).

12.) Connect probe on port3 and repeat step 8) ~ 10).

13.) All basic functions must show correct operation as described.

4-9-2 LMT Assy function check procedure

1.) Turn on the system and check the completion of Echoloader loading.

2.) Check the system basic functions. Refer to Section 4-3-4 - System B/M-Mode Checks on page 4-7. Refer to Section 4-3-5 - System CFM and PWD Checks on page 4-9.

4-9-3 PMP Assy function check procedure

1.) Turn on the system and check the completion of Echoloader loading.

2.) Do the Service Login. Refer to the Section 5-10-2-2 - Service Login on page 5-33.

3.) Select 'Diagnostics'=>'LOGIQ 5 Diagnostics'=>'FRU Test'=>'PMP Full Test'

4.) Execute the diagnostic test.

5.) All diagnostic test item of PMP should be passed.

Figure 4-43 PMP Diagnostic test

6.) Check the system basic functions. Refer to Section 4-3-4 - System B/M-Mode Checks on page 4-7. Refer to Section 4-3-5 - System CFM and PWD Checks on page 4-9.

4-9-4 RDS Assy function check procedure

1.) Turn on the system and check the completion of Echoloader loading.
2.) Do the Service Login. Refer to the Section 5-10-2-2 - Service Login on page 5-33.
3.) Select 'Diagnostics'=>'LOGIQ 5 Diagnostics'=>'FRU Test'=>'RDS Full Test'
4.) Execute the diagnostic test.
5.) All diagnostic test item of RDS should be passed.

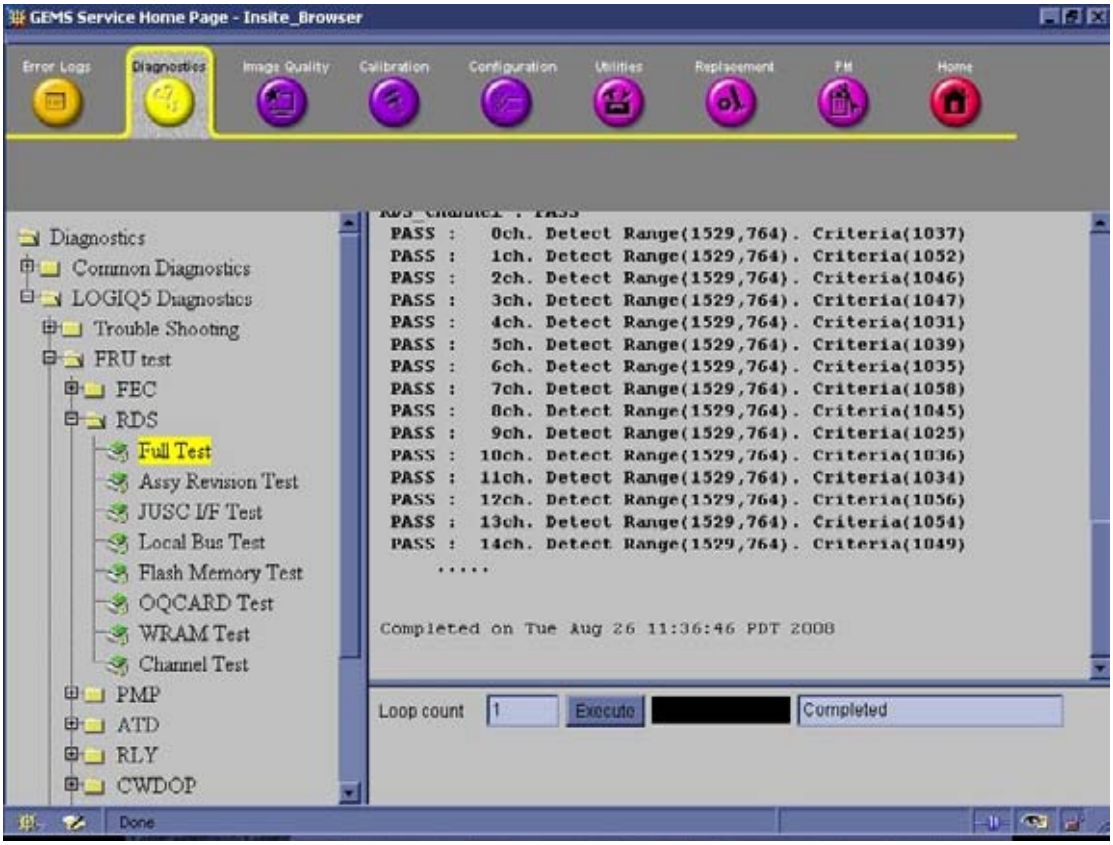

Figure 4-44 RDS Diagnostic test

6.) Check the system basic functions. Refer to Section 4-3-4 - System B/M-Mode Checks on page 4-7. Refer to Section 4-3-5 - System CFM and PWD Checks on page 4-9.

4-9-5 ATD Assy function check procedure

1.) Turn on the system and check the completion of Echoloader loading.
2.) Do the Service Login. Refer to the Section 5-10-2-2 - Service Login on page 5-33.
3.) Select 'Diagnostics'=>'LOGIQ 5 Diagnostics'=>'FRU Test'=>'ATD Full Test'
4.) Execute the diagnostic test.
5.) All diagnostic test item of ATD should be passed.

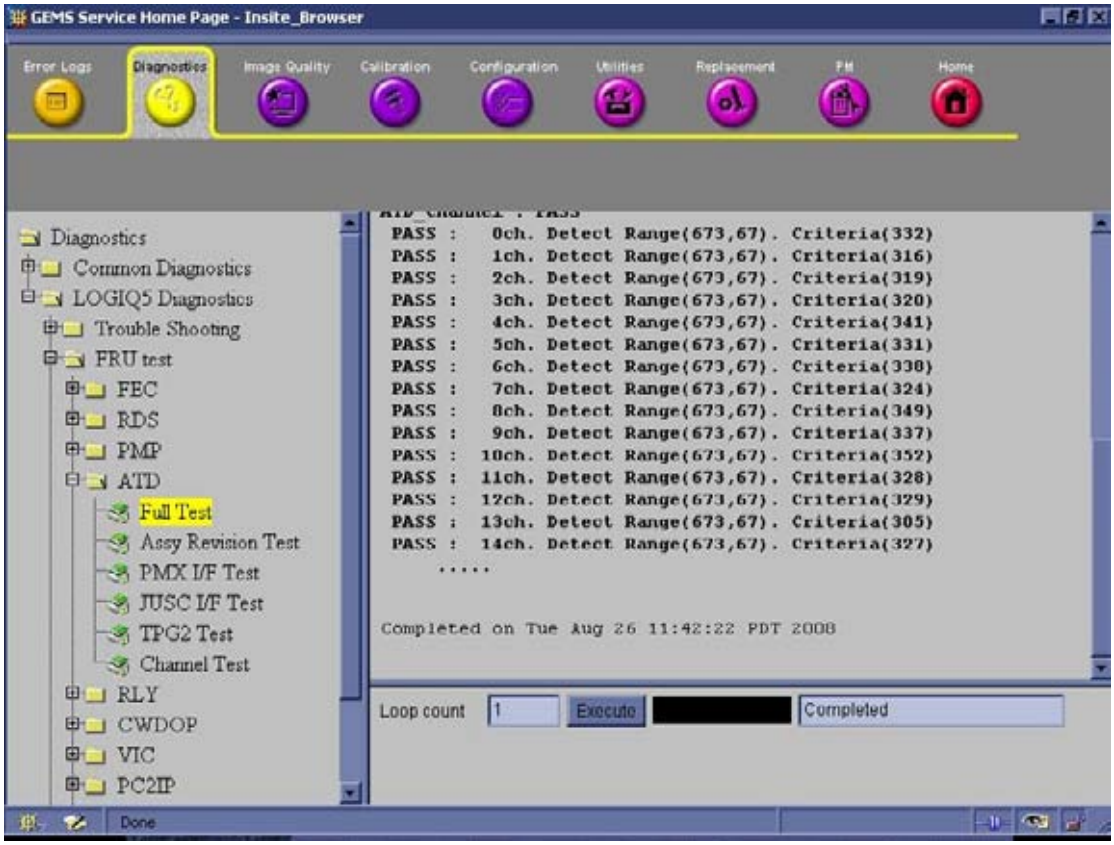

Figure 4-45 ATD Diagnostic test

6.) Check the system basic functions. Refer to Section 4-3-4 - System B/M-Mode Checks on page 4-7. Refer to Section 4-3-5 - System CFM and PWD Checks on page 4-9.

4-9-6 FECII Assy function check procedure

1.) Turn on the system and check the completion of Echoloader loading.
2.) Do the Service Login. Refer to the Section 5-10-2-2 - Service Login on page 5-33.
3.) Select 'Diagnostics'=>'LOGIQ 5 Diagnostics'=>'FRU Test'=>'FECII Full Test'
4.) Execute the diagnostic test.
5.) All diagnostic test item of FECII should be passed.

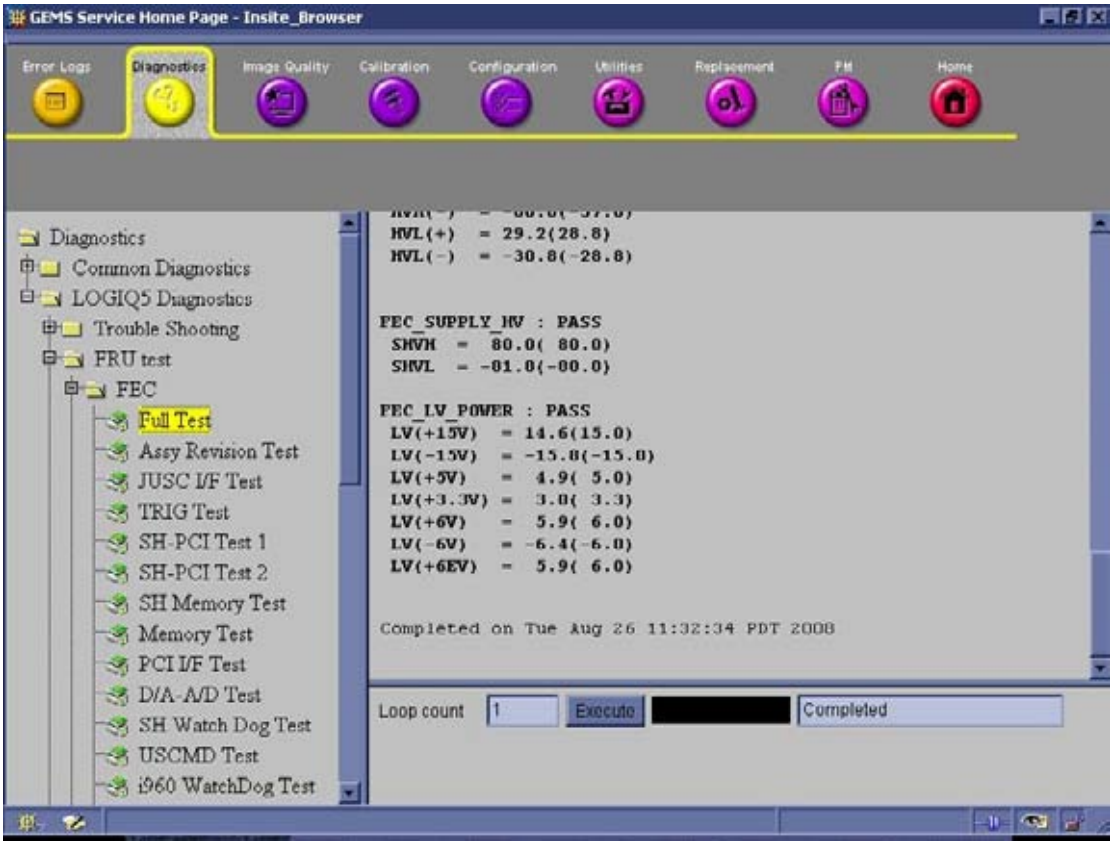

Figure 4-46 FECII Diagnostic test

6.) Check the system basic functions. Refer to Section 4-3-4 - System B/M-Mode Checks on page 4-7. Refer to Section 4-3-5 - System CFM and PWD Checks on page 4-9.

4-9-7 CWDOP Assy function check procedure

1.) Turn on the system and check the completion of Echoloader loading.
2.) Do the Service Login. Refer to the Section 5-10-2-2 - Service Login on page 5-33.
3.) Select 'Diagnostics'=>'LOGIQ 5 Diagnostics'=>'FRU Test'=>'CWDOP Full Test'
4.) Execute the diagnostic test.
5.) All diagnostic test item of CWDOP should be passed.

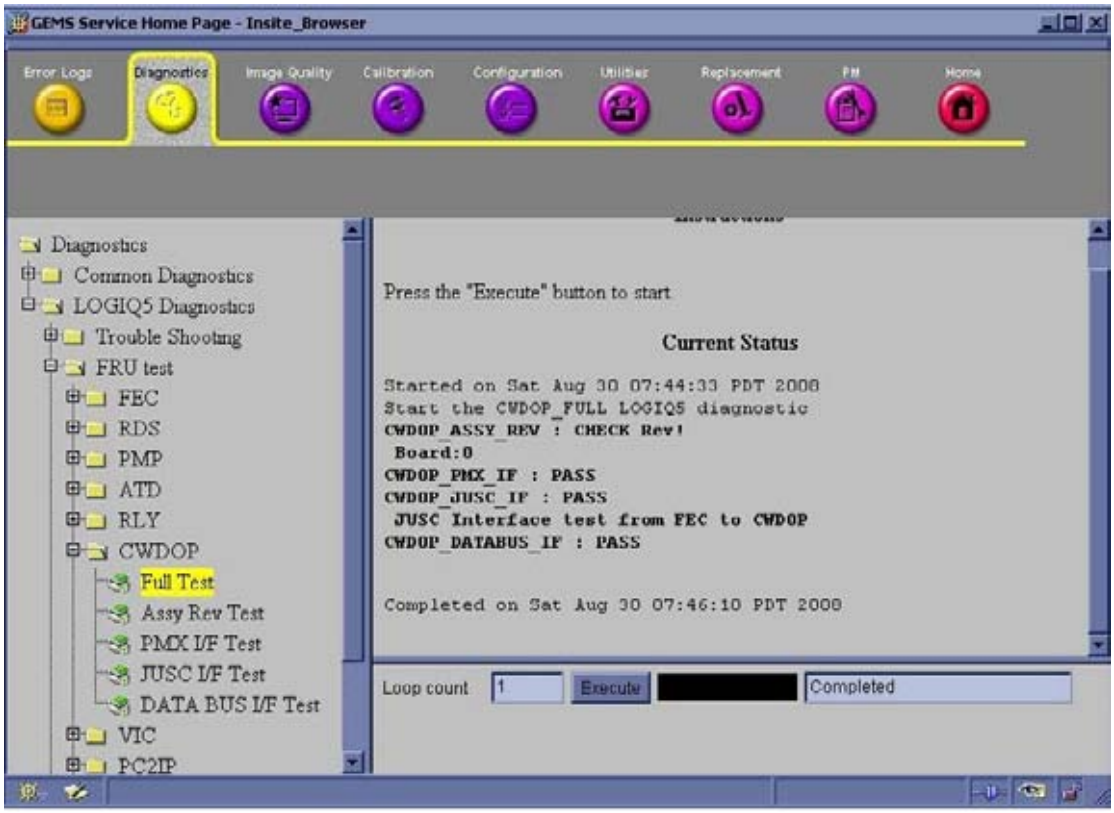

Figure 4-47 CWDOP Diagnostic test

6.) Reboot up the system
7.) Connect Probe in Probe port (Sector or Pencil Probe).
8.) After system boot up, select the CWD mode.
9.) Check the system basic functions. Refer to Section 4-3-5 - System CFM and PWD Checks on page 4-9.

4-9-8 Backplane Assy function check procedure

1.) Turn on the system and check the completion of Echoloader loading.

2.) Check the system basic functions. Refer to Section 4-3-4 - System B/M-Mode Checks on page 4-7. Refer to Section 4-3-5 - System CFM and PWD Checks on page 4-9.

4-9-9 SIG Assy function check procedure

1.) Turn on the system and check the completion of Echoloader loading.

2.) Check the system basic functions. Refer to Section 4-3-4 - System B/M-Mode Checks on page 4-7. Refer to Section 4-3-5 - System CFM and PWD Checks on page 4-9.

4-9-10 DC FAN Assy function check procedure

1.) After replace DC FAN Assy, turn on the system. Refer to Section 3-5-1 - Power On/Boot Up on page 3-11.

2.) Check the FAN rotating with naked eye and check the FAN operating by rotating sound. No strange sound should be heard.

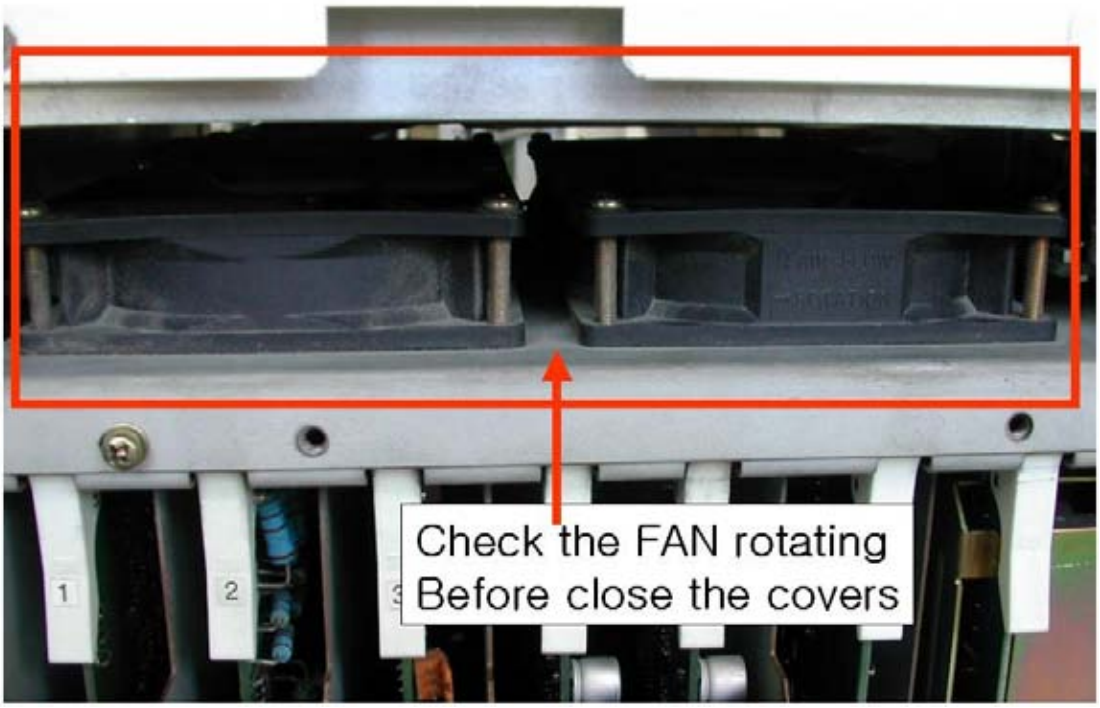

Figure 4-48 Check DC FAN rotating

NOTE: Do not close the EMI BRKT and right plastic cover before check the FAN operation.

4-9-11 BEP Assy function check procedure

4-9-11-1 HDD, Memory, CPU Diagnositc Test

1.) The Start up Screen will be shown on the Monitor display when the system is Turned ON.

2.) Figure 4-49 displays when Service Dongle inserted in Rear Panel.

Figure 4-49 Start Application window

3.) To enter the Maintenance Mode, select Maintenance button.

4.) To start Diagonistic Test, Execute PC Doctor.
'Start' => 'Programs' => 'PC Doctor'

5.) HDD Test
Select Hard driver test manu, start to testing(Figure 4-50).

Check display 'Pass' massage

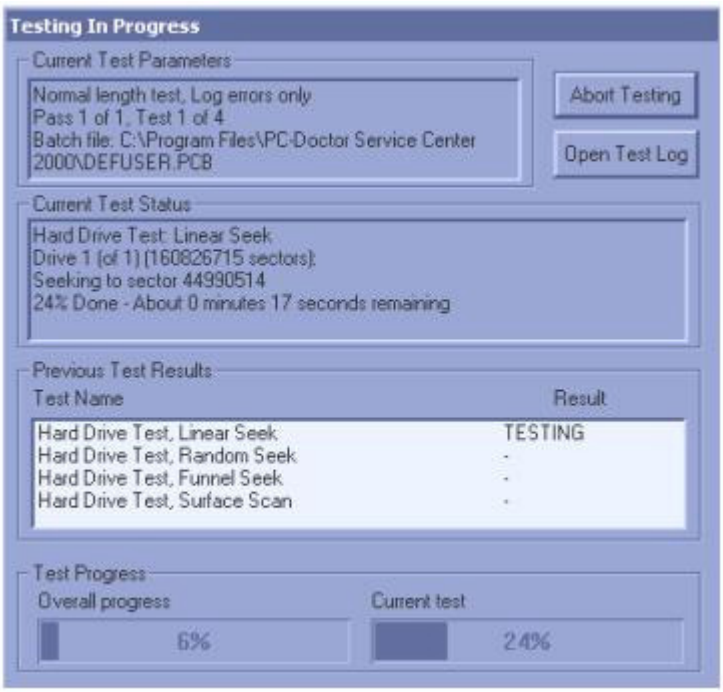

Figure 4-50 HDD Test

4-9-11-1 HDD, Memory, CPU Diagnositc Test (cont'd)

6.) Memory Test

Select Memory test manu, start to testing.

Check display 'Pass' massage

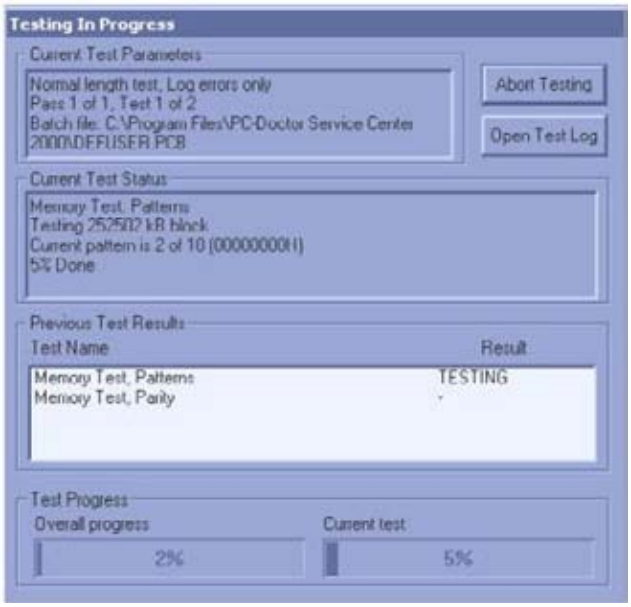

Figure 4-51 Memory Test

7.) CPU Test

Select CPU test manu, start to testing.

Check display 'Pass' massage

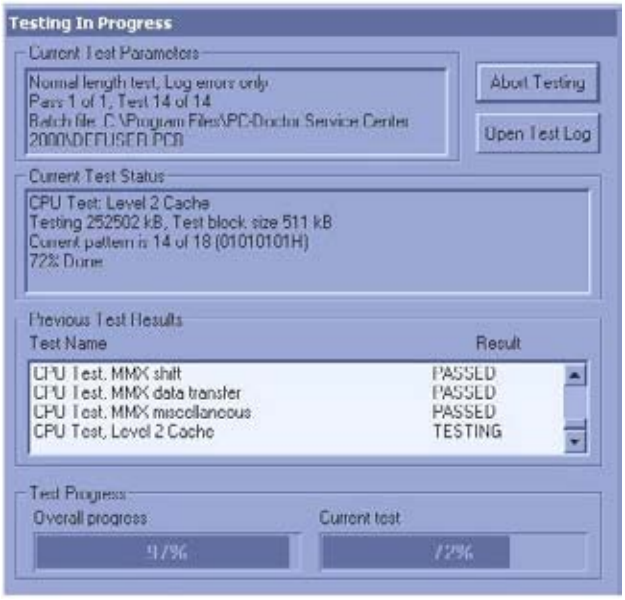

Figure 4-52 CPU Test

4-9-11-2 Basic Function Test

1.) Turn on the system and check the completion of Echoloader loading.

2.) Check the system basic functions. Refer to Section 4-3-4 - System B/M-Mode Checks on page 4-7. Refer to Section 4-3-5 - System CFM and PWD Checks on page 4-9.

4-9-11-3 Peripheral Test

1.) See “Peripheral Checks” on page 4-22.

4-9-12 VIC Assy function check procedure

1.) Turn on the system and check the completion of Echoloader loading.
2.) Do the Service Login. Refer to the Section 5-10-2-2 - Service Login on page 5-33.
3.) Select 'Diagnostics'=>'LOGIQ 5 Diagnostics'=>'FRU Test'=>'VIC Full Test'
4.) Execute the diagnostic test.
5.) All diagnostic test item of VIC should be passed.

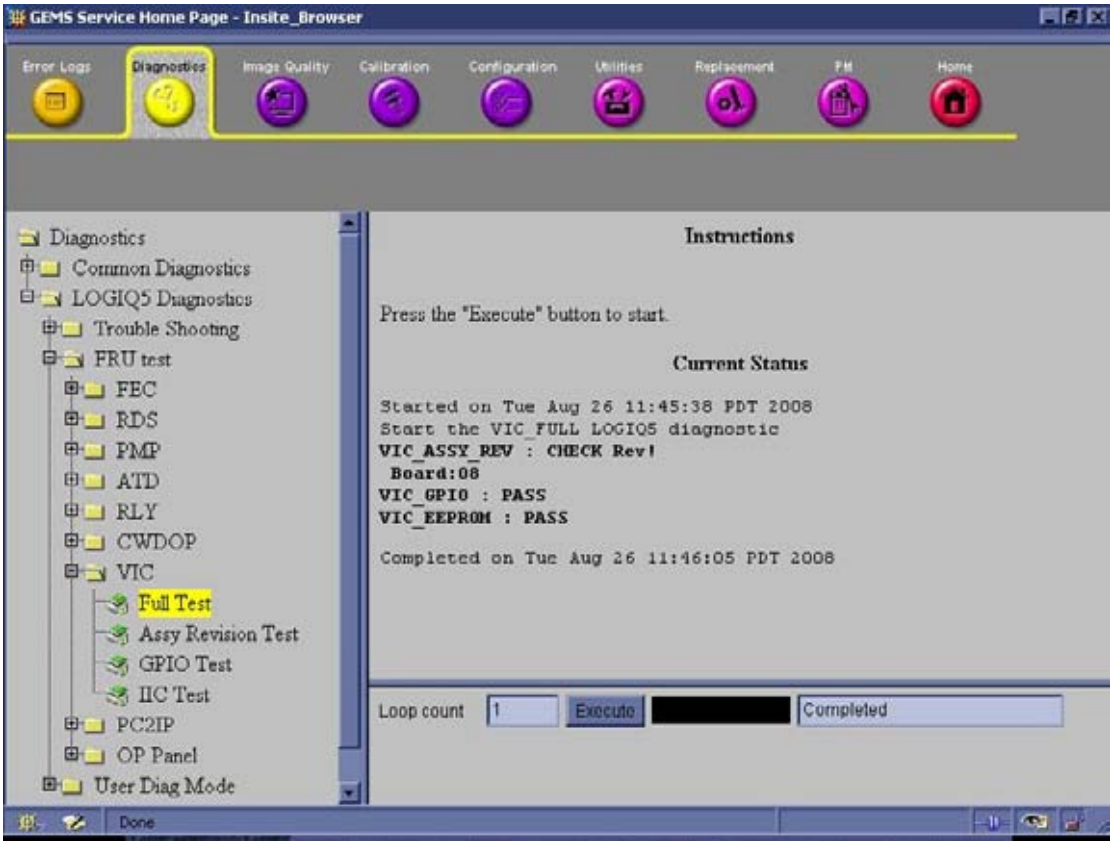

Figure 4-53 VIC Diagnostic test

6.) Check the system basic functions. Refer to Section 4-3-4 - System B/M-Mode Checks on page 4-7. Refer to Section 4-3-5 - System CFM and PWD Checks on page 4-9.

4-9-13 SMPS, HDD, ODD Assy function check procedure

4-9-13-1 SMPS Assy Test

1.) Turn on the system and check the completion of Echoloader loading.

2.) Check the system basic functions. Refer to Section 4-3-4 - System B/M-Mode Checks on page 4-7. Refer to Section 4-3-5 - System CFM and PWD Checks on page 4-9.

4-9-13-2 HDD Test

1.) Refer to Section 4-9-11-2 - Basic Function Test on page 4-50.

4-9-13-3 ODD Test

1.) Turn on the system and check the completion of Echoloader loading.

2.) Enter "Patient" Mode

3.) Select "Transfer" button and then Insert CD/DVD media which is included patient data. Execute "Import".

Check display 'Success' message.

4.) Select "Transfer" button and then execute "Export". Insert empty CD/DVD media.

Check display 'Success' message.

5.) Execute "Ez back up". Insert empty CD/DVD media.

Check display 'Success' message.

4-9-14 PC2IP Assy function check procedure.

1.) Turn on the system and check the completion of Echoloader loading.

2.) Do the Service Login. Refer to the Section 5-10-2-2 - Service Login on page 5-33.

3.) Select 'Diagnostics'=>'LOGIQ 5 Diagnostics'=>'FRU Test'=>'PC2IP Full Test'

4.) Execute the diagnostic test.
All diagnostic test item of PC2IP should be passed.

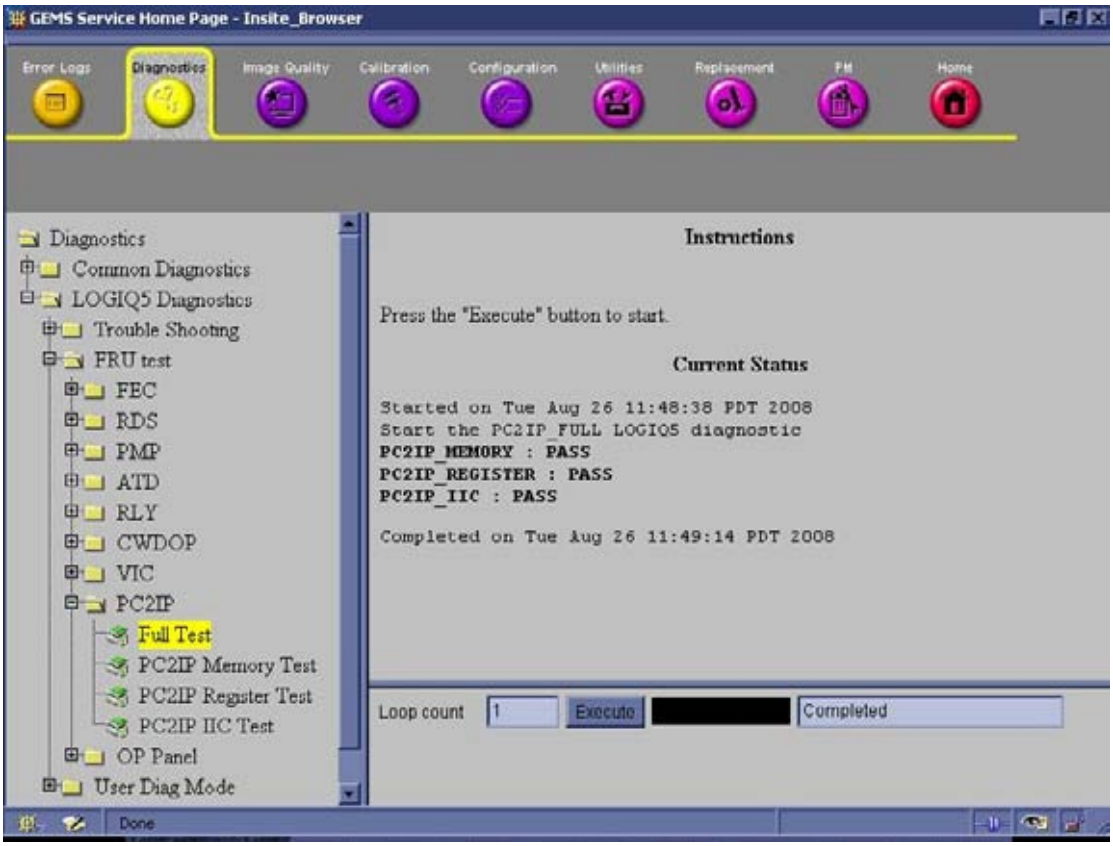

Figure 4-54 PC2IP Diagnostic test

5.) Check the system basic functions. Refer to Section 4-3-4 - System B/M-Mode Checks on page 4-7. Refer to Section 4-3-5 - System CFM and PWD Checks on page 4-9.

4-9-15 AC Power Assy function check procedure.

1.) Turn on the system and check the completion of Echoloader loading.

2.) Check the system basic functions. Refer to Section 4-3-4 - System B/M-Mode Checks on page 4-7. Refer to Section 4-3-5 - System CFM and PWD Checks on page 4-9.

4-9-16 LV Unit function check procedure

1.) Turn on the system and check the completion of Echoloader loading.

2.) Check the system basic functions. Refer to Section 4-3-4 - System B/M-Mode Checks on page 4-7. Refer to Section 4-3-5 - System CFM and PWD Checks on page 4-9.

4-9-17 JPC function check procedure

1.) Turn on the system and check the completion of Echoloader loading.

2.) Check the system basic functions. Refer to Section 4-3-4 - System B/M-Mode Checks on page 4-7. Refer to Section 4-3-5 - System CFM and PWD Checks on page 4-9.

4-9-18 Transformer function check procedure

1.) Turn on the system and check the completion of Echoloader loading.

2.) Check the system basic functions. Refer to Section 4-3-4 - System B/M-Mode Checks on page 4-7. Refer to Section 4-3-5 - System CFM and PWD Checks on page 4-9.

4-9-19 AC Power Box function check procedure

1.) Turn on the system and check the completion of Echoloader loading.

2.) Check the system basic functions. Refer to Section 4-3-4 - System B/M-Mode Checks on page 4-7. Refer to Section 4-3-5 - System CFM and PWD Checks on page 4-9.

4-9-20 Fuse set function check procedure

1.) Turn on the system and check the completion of Echoloader loading.

Check the system basic functions. Refer to Section 4-3-4 - System B/M-Mode Checks on page 4-7. Refer to Section 4-3-5 - System CFM and PWD Checks on page 4-9.

Section 4-10
Site Log

Table 4-12 Site Log

Date	Service person	Problem	Comments

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Chapter 5
Components and Fuctions (Theory)

Section 5-1
Overview

5-1-1 Purpose of Chapter 5

This chapter explains LOGIQ™ 5's system concepts, component arrangement, and subsystem function. It also describes the Power Distribution System (PDS) and probes.

Table 5-13 Contents in Chapter 5

Section	Description	Page Number
5-1	Overview	5-1
5-2	General Information	5-2
5-3	Block Diagram	5-3
5-4	Front End	5-5
5-5	Backend Processor	5-14
5-6	Top Console	5-16
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5-9	Air Flow	5-30
5-10	Service Platform	5-32

Section 5-2
General Information

LOGIQ™ 5 is a phased and linear array ultrasound imaging scanner. It has provisions for analog input sources like ECG and Phono. A Doppler probe may also be connected and used.

The system can be used for:

- 2D Gray Scale and 2D Color Flow Imaging
- M-Mode Gray Scale Imaging
- Color M-Mode
- Doppler
- Different combinations of the above modes

LOGIQ™ 5 is a digital beamforming system.

Signal flow travels from the Probe Connector Panel to the Front End Electronics, to the Back-End Processor, and finally displayed on the monitor and peripherals.

System configuration is stored on the hard drive and all necessary software is loaded from the hard drive on power up.

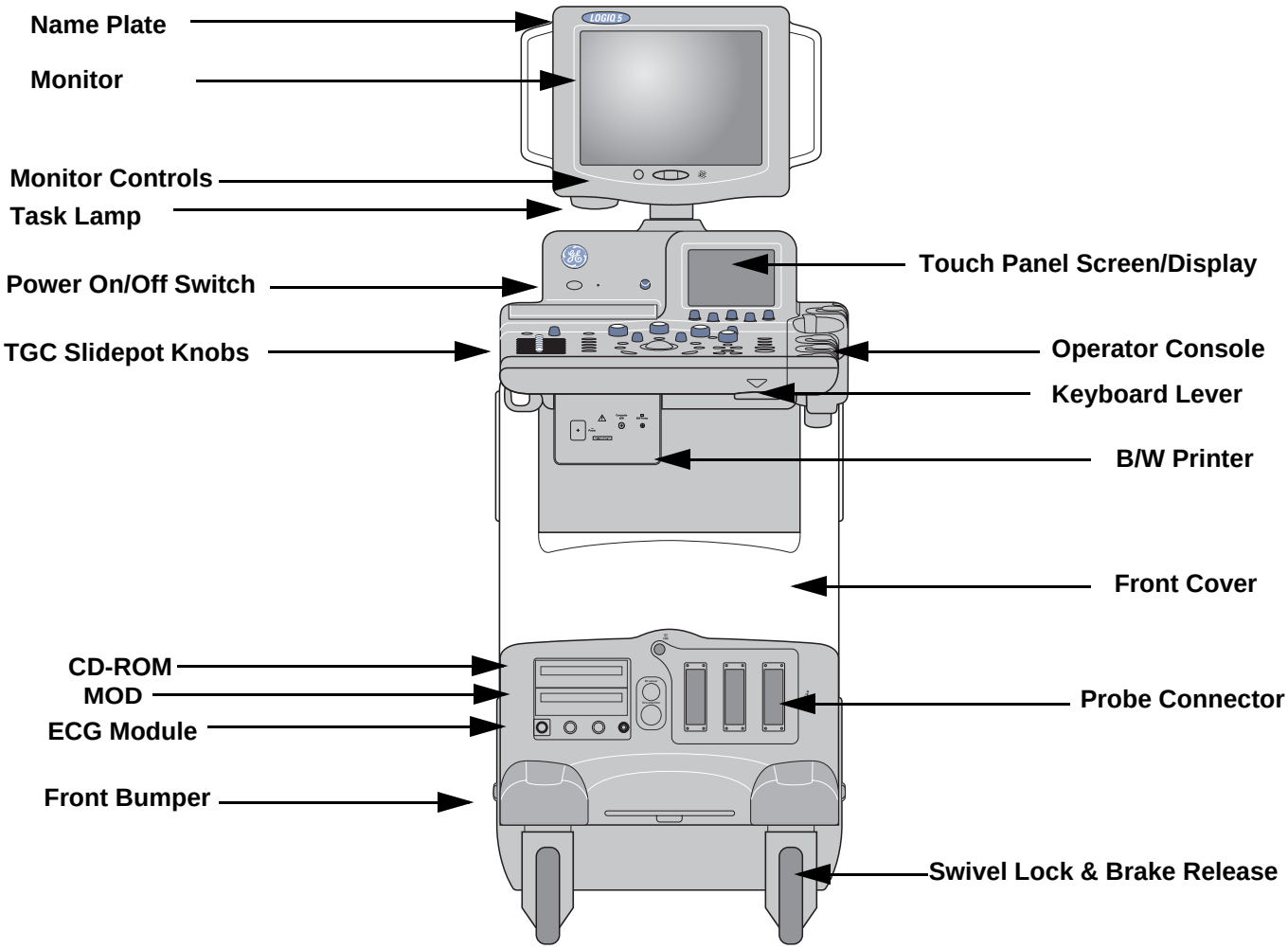


Figure 5-1 LOGIQ™ 5 Major Components

Section 5-3
Block Diagram

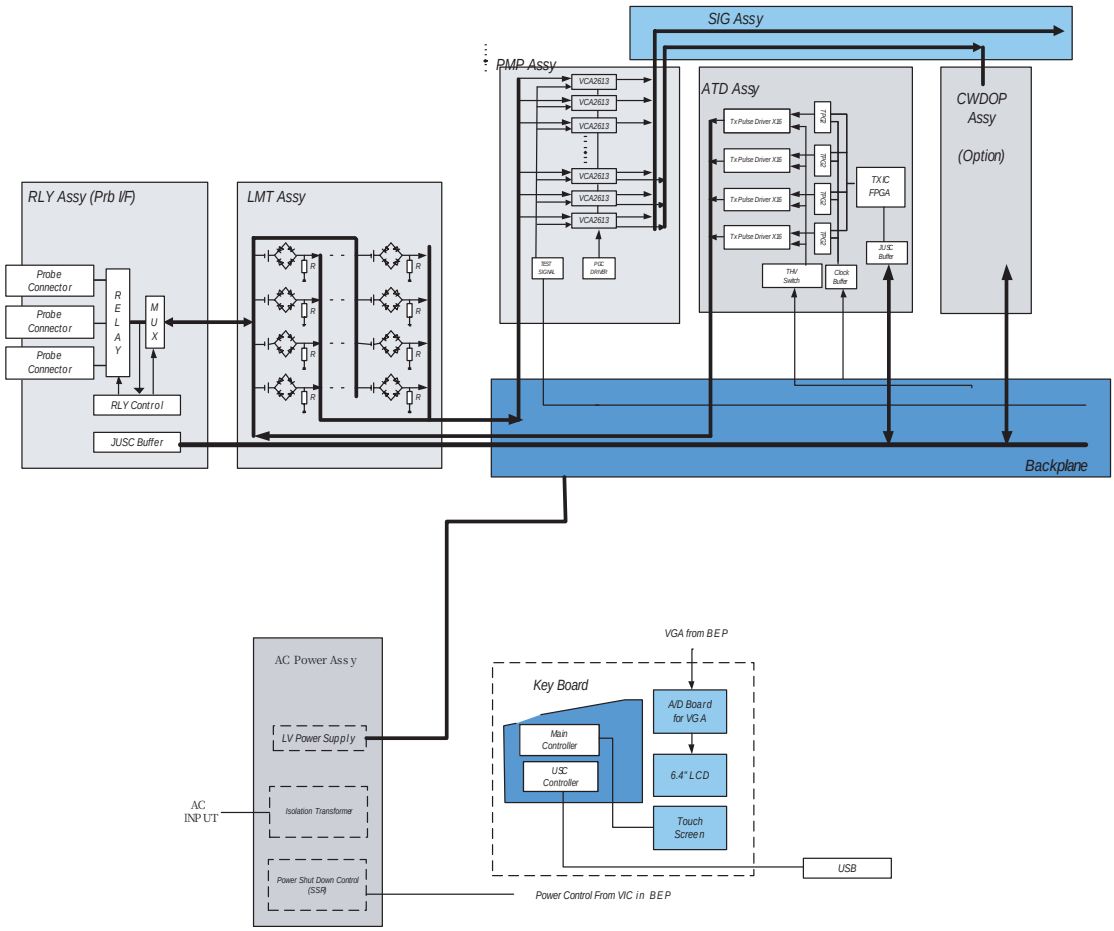


Figure 5-2 LOGIQ™ 5 System Block Diagram

Section 5-3 Block Diagram (cont'd)

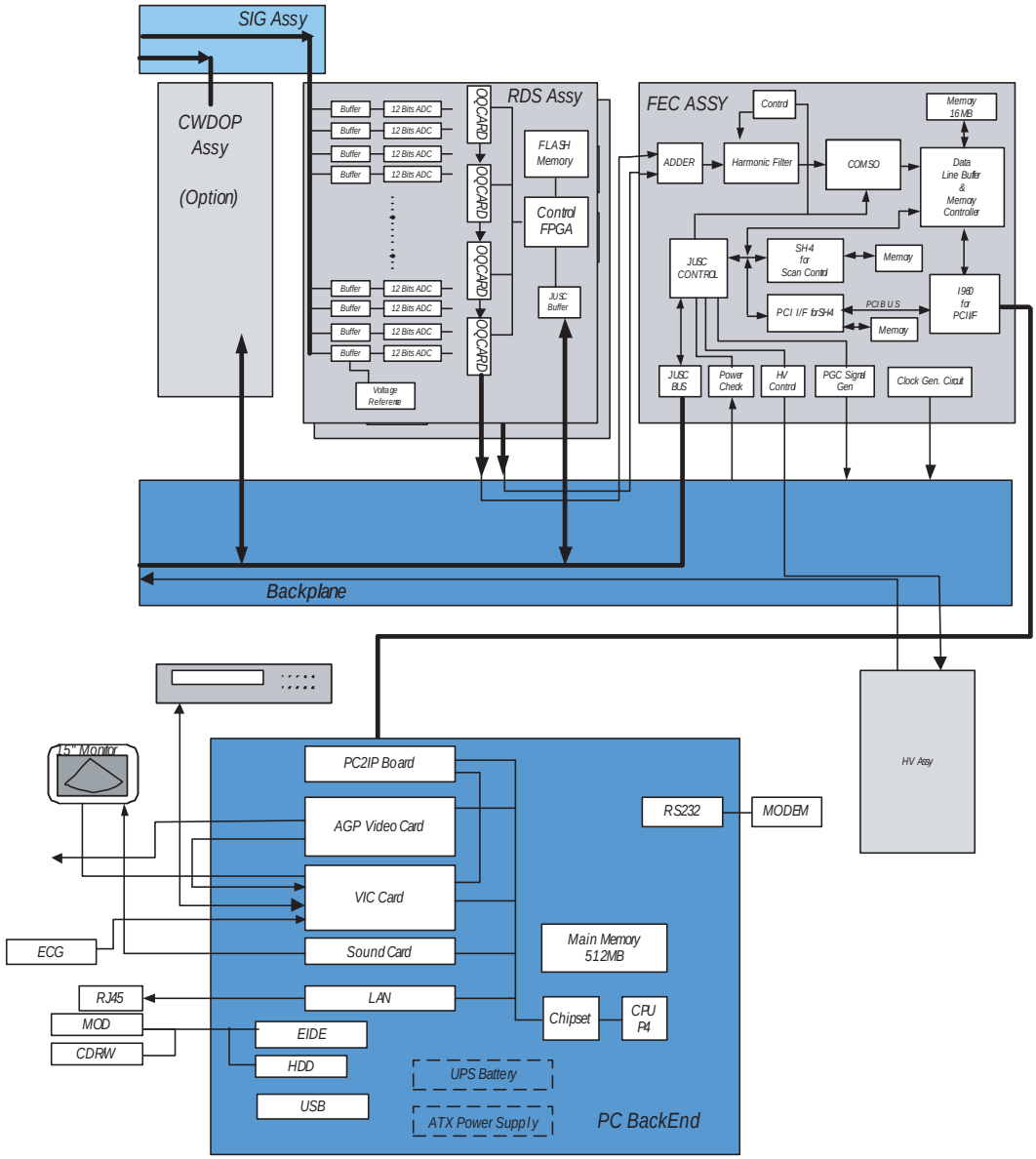


Figure 5-3 LOGIQ™ 5 System Block Diagram (cont'd)

Section 5-4
Front End

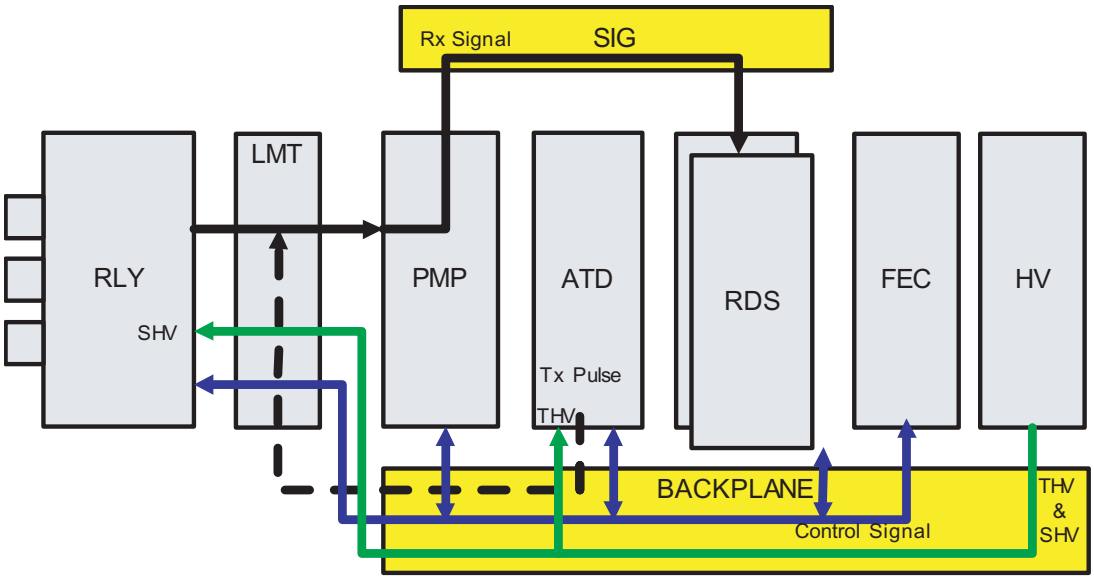


Figure 5-4 The Front End

The Front End generates the strong burst transmitted by the probes as ultrasound into the body. It also receives weak ultrasound echoes from blood cells and body structure, amplifies these signals and converts them to an digital signal.

The digital representation of this signal is presented to the Mid Processor section.

- RLY(Relay) : RLY Assy contains 3 connectors for probe interface and arrays of relays for switchable connection. High voltage multiplexer provide connection between 128 signal of probe and selectable 64 channels transmit/receive signal
- LMT (Limiter) : This has transmit/receiving switch to isolate rx signal circuit from transmit pulse.
- PMP(Preamplifier) : The preamplifier amplifies 64 echo signals. The amplified receiving signals are sent to RDS.
- ATD (Advanced Transmit Driver) :This has 64 channel Transmit pulse generator, bipolar pulse drivers, delay controller.
- RDS (Receiving Delay Summing) : Cascading two receiving beam formers (two RDSs) allows the system to achieve 64ch delay summing.
- FEC (Front End Control) : FEC control scan operation and transfer the scan parameters to others board, ATD,RDS,RLY,PMP. Proper signal processing for tissue and dop are done in FEC
- HV(High Voltage) : Generates THV and SHV for transmit pulse driver and High voltage mux.
- SIG(Signal) : Receiving echo signal from PMP is transfer to RDS through this SIG

5-4-1 RLY

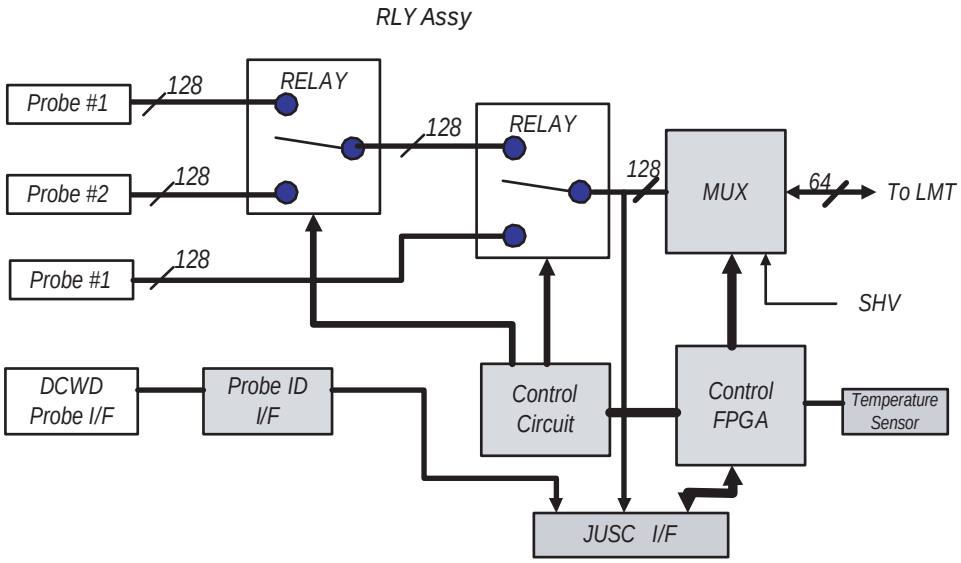


Figure 5-5 RLY Block Diagram

RLY ASSY contains of 3 phased array probe connectors and provides switchable connection between probes and 64ch transmitters/receivers.

This board also has interface for a single CWD probe connector.

The main function of RLY ASSY is as follows.

- 3-to-1 selectors for three probes.
- Interface with JUSC bus (control bus)
- Interface with FEC ASSY for IIC bus.
- Interface with DCWD Connector.
- Supply/Cut control and failure detection of supply voltage for Mux circuit in a Probe.
- Device: Mechanical Relay
- Switch: 128ch 3:1 selector
- Temperature sensor in this assy detects temperature of RLY assy.

5-4-1-1 Interface to Probe

- Probe Status detection
  - Detects whether or not a probe is connected.(POPEN)
  - Detects ID code of a connected probe.(PCODE)
- Mux Interface
  - Transfers control data of Mux to a probe.(CONSYS,CONSTA)
  - Enables/Disables control of data.
  - Detects whether Mux data setting is finished or not.
- Power Supply for Mux
  - Supply/Cut control:
    +5V and +15V on a connector are supplied while a probe is connected to the connector.
    +/-SHV are supplied only while a probe is selected.
- Surface temperature

- Detects resistance of a thermistor in a probe head as voltage when the probe is selected.(PTEMP) This signal is connected to FEC.

• LED Blinking
  - The LED in a probe blinks when the probe is selected.

5-4-1-2 IIC bus

- Connects signals of IIC bus with a relay when IIC bus access is required.
- Selects one of thress probes that IIC access with 3-to-1 switch.

5-4-2 LMT

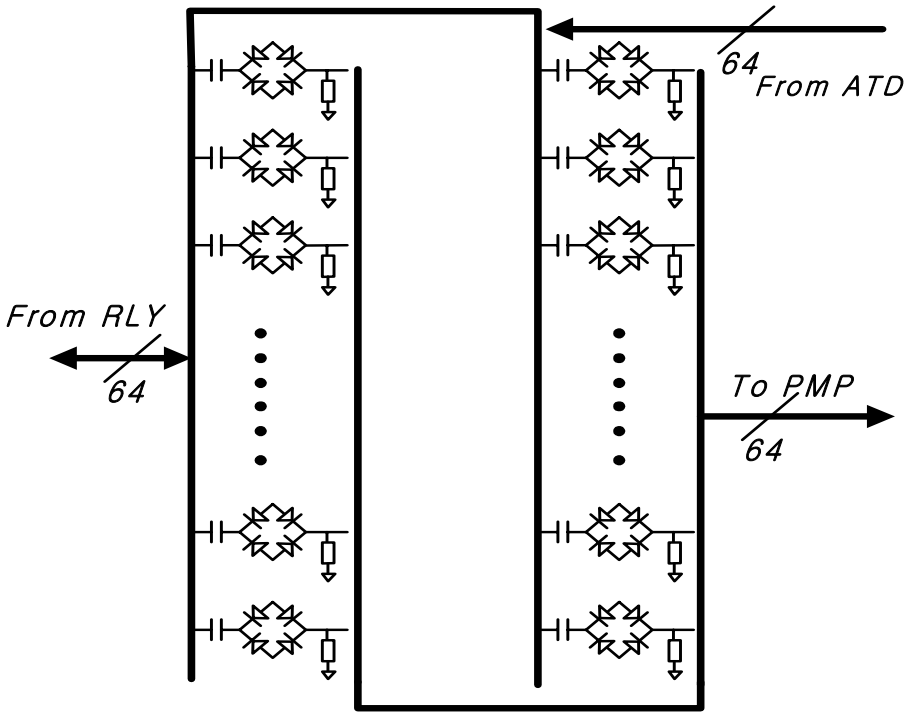


Figure 5-6 LMT Block Diagram

The main function of LMT ASSY is as follows.

- 64ch transmit/receiving switches protect a Pre-amp from a high voltage transmit pulse
- All control signal and DC power for RLY pass thorugh this LMT Assy

5-4-3 PMP

5-4-3-1 Overview

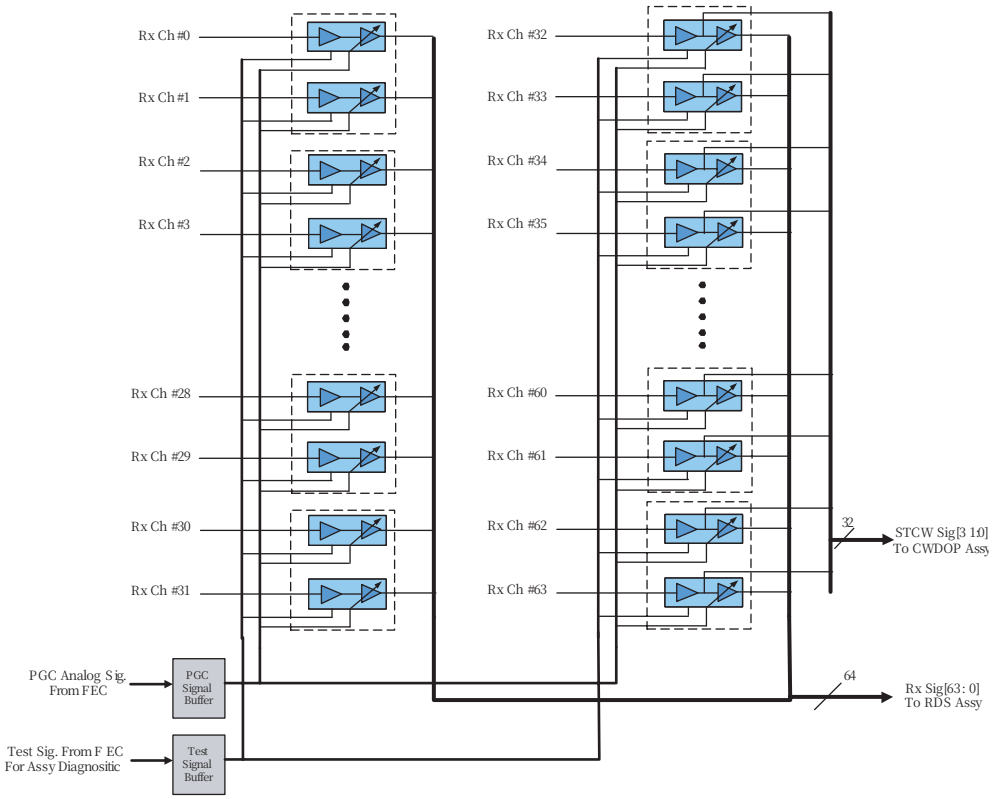


Figure 5-7 PMP Block Diagram For a Channel

The PMP (Pre-Amplifier) board receives and amplifies each 64 echo signals. Then, all 64 echo signals (from 0 to 63ch) are outputted to the RDS sub-system (two RDS ASSYs) and following 32 echo signals (from 32 to 63ch) are simultaneously outputted to the CWDOP ASSY via the SIG ASSY.

The PMP ASSY can amplify 64 echo signals. So, the echo signals are received by a PMP ASSY under appropriate control. The PMP ASSY are inserted into Nest box, which is composed of BACKPLANE board and other several daughter boards.

The PMP ASSY have main three blocks: Pre-amp and Gain Control and Mode control block.

the PMP ASSY amplifies the echo signals. The mode control block selects a maximum gain code via dedicated control signals from FEC.

The analog signal provided by Gain Control block gives total amplified gain.

The block diagram above of the PMP ASSY for a received signal is given. Actually, there are 64 channels equivalent to figure above for a PMP ASSY.

The Pre-amp block consists of Low Noise Amplifier (LNA) and Variable Gain Amplifier (VGA). A received signal is amplified by LNA (fixed gain), then amplified by VGA (variable gain).

5-4-4 ATD

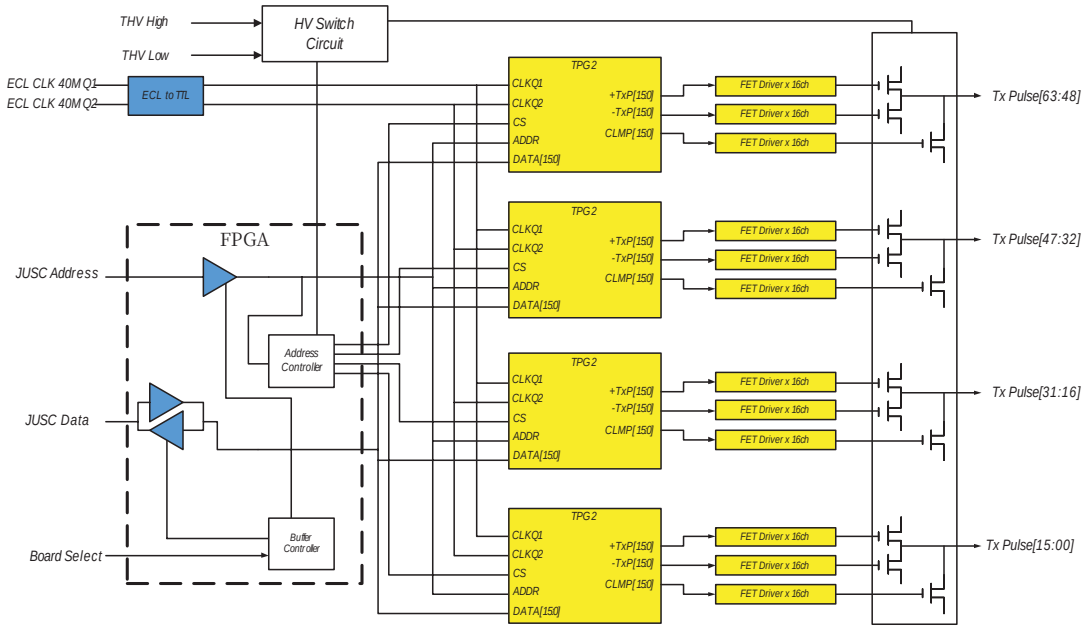


Figure 5-8 ATD Block Diagram

5-4-4-1 Overview

The ATD ASSY (Advanced Transmit Driver) generate bipolar transmit pulse for probe. This ASSY has 64 channels transmit signal drivers, Transmit Pulse Generator ASIC, control FPGA and so on. Transmit pulse are generated by TPG2 ASIC. Each TPG2 ASIC makes 16 channels signals, so total 4 ASIC are used in ATD assy. All of control informations for pulse generation, pulse width, time delay of each channel are come from FEC in real time via backplane. The control FPGA, TXIC FPGA provide interfcae between FEC and TPG2 ASICs and control operation condition of ATD assy

Main items are

* TXIC FPGA : Interface and controller FPGA. This FPGA provide the interface with FEC assy that master of scan control.
* TPG2 ASIC: A TPG2 ASIC can generate 16 channels logic level transmit pulse signal. This ASIC use 2 phase 40MHz clocks for transmit delay control and pulse generation. 40Mhz operation clocks are come from FEC assy via backplane.
* Transmit Pulse Driver : TPG2 ASIC generated logic level signal for transmit pulse. So this signal need to be expanded to high voltage signal. Driver circuit make logic level signal to high voltage level signal.
* THV Switch : LOGIQ5 system use dual transmit high voltage for transmit driver because B mode and CFM mode use differnet voltage level of transmit pulse. So in duplex of trplex mode, B/CFM or B/DOP, Low THV and High THV are switched in ATD assy in real time

5-4-5 RDS

5-4-5-1 Overview

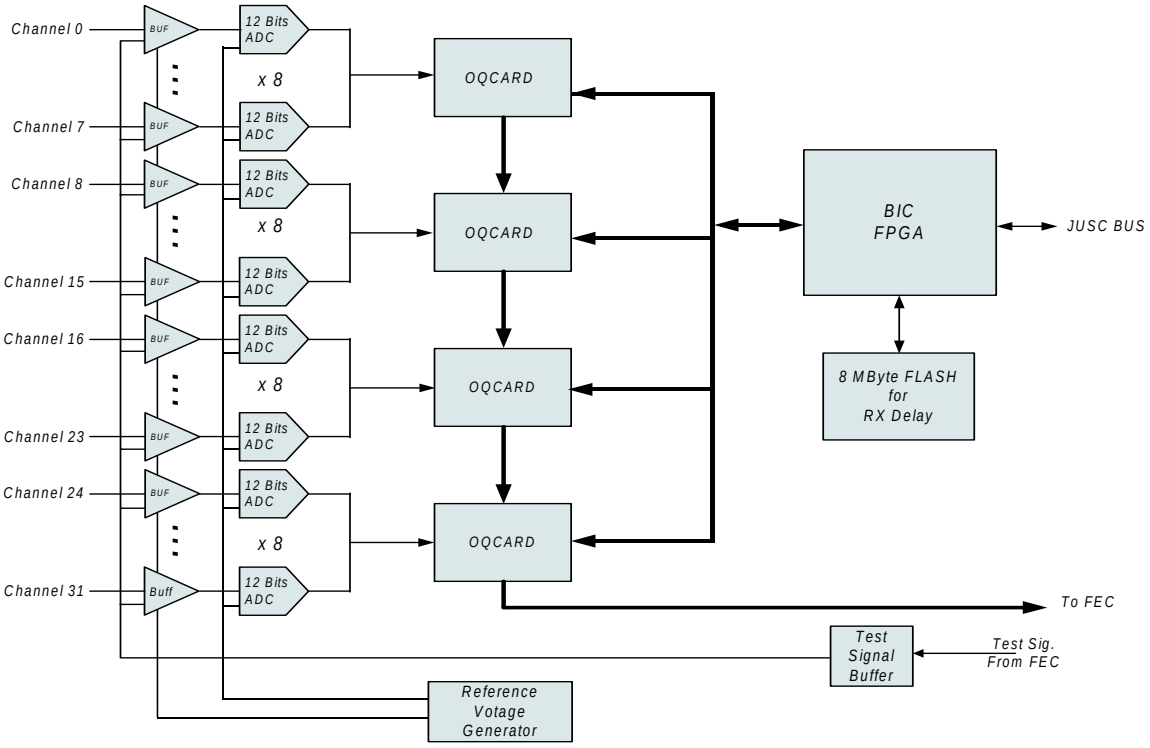


Figure 5-9 RDS Block Diagram

The RDS sub-system is the receive beam former and consist of 2 RDS assys. Each RDS assy have capability of 32 channels digital receive beamforming. The each digital beamforming output data of the RDS assy are sent to FEC. FEC add each other and makes final 64 channel beamforming data

Delay control data for recevie beamforming are contained in Flash memory. Typically 2 or 3 probes data are saved in flash memory. If new probe is connected, additional probe data will be downloaded from HDD in BEP to Flash memory

Main items are

- BICTOP FPGA : Provide innterfaces with FEC through JUSC Bus. This fpga control all OQCARD asic for receive beamforming. All of parameter information for asic operation are loaded into OQCARD asic from FEC through this fpga.
- OQCARD :Digital receive beamforming ASIC. Ecah OQCARD have capability of 8 channel receiving data inputs. Each input data can be 12 bits. Operation clock is 40 MHz. 4 OQCARD asics are used in a RDS board and each OQCARD summing data output are cascaded to next OQCARD asic. So the last summing output of the last OQCARD are transferred to FEC for adding two summing data of each RDS board. The receve beamforming contrlo logic in OQCARD asic need delay information data for each channel's control logic. This delay information data are downloaded into asic from flash memory by BICTOP fpga.
- Flash Memory : Flash memory keep the receive delay data for OQCARD asic. During scan time, these data are downloaded into OQCARD asic by bictop fpga. Memory capacity is 8MBytes each board, typically 2 or 3 probes data .

5-4-5-2 RDS (cont'd)

- Reference Voltage Generator : This mode is for imaging. The parameters specific to scan line number are sent to OQCARDs and the start triger for receiving signals is generated.
- Access Mode:
  This mode is for accessing flash memories and OQCARDs.

5-4-6 FEC

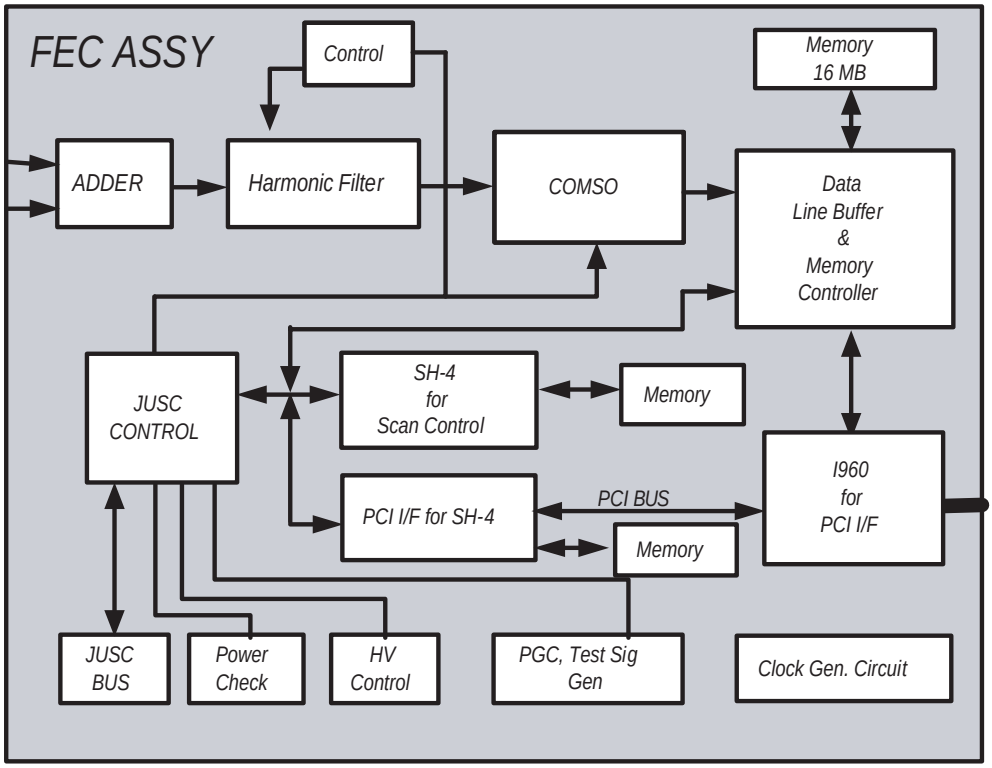


Figure 5-10 FEC Block Diagram

5-4-6-1 Overview

- CHAF:
  Three CHAFs have functions of coded excitation decorder and 2nd harmonic filter.
- BIPC and RIF:
  Have functions of RF memory controller.
  The RIF mainly controls RF memory data bus, RF data flow pass, and RF gain.
  The BIPC, which is interface of JUSC bus, mainly controls CHAF and RF memory address bus.
- COMSO:
  Has functions of detector, B/M mode edge enhance, Log compression, and dynamic range control.
- PCI IF:
  Converts JUSC bus in FEC board. The local bus is connected to each block. It transfers B/M mode data to PACO FPGA via the COMSO data bus.
- USC IF:
  Has functions of generation to JUSC bus, generation of TGC signal and test signal for self-diagnostics, COMSO control.

5-4-6 FEC (cont'd)

- CLK Generator Block:
  Generates 40MHz (two phases), and 26.6MHz clock using 160MHz master clock.
- Real Time Controller (RTCL):
  The TRIG cyclical Real Time Control is done by SH4 RISC processor. SH4 is a one of MID BUS agent through SH-PCI bridge.
- PCI - PCI Bridge:
  It Bridges between Mid bus and host side PCI bus by using i960RP. Mid bus is basically compliant to CompactPCI. Primary side PCI is connected to Host PC through PCIcable and PC2IP which is mounted on PCI slot of PC-motherboard.
- Image Data Transferring:
  It receives image data from COMSO, and send them to Host side. Data are buffered when receiving on COMSO data bus. After buffered, data are stored and handled on Local side of i960. And DMA function of i960RP perform data transferring to host PC memory.
  - Peripheral Control:
    The SH4 or i960RP also performs other functions like safety observation, HV Control and so on.

5-4-7 HV Power(Tx Power)

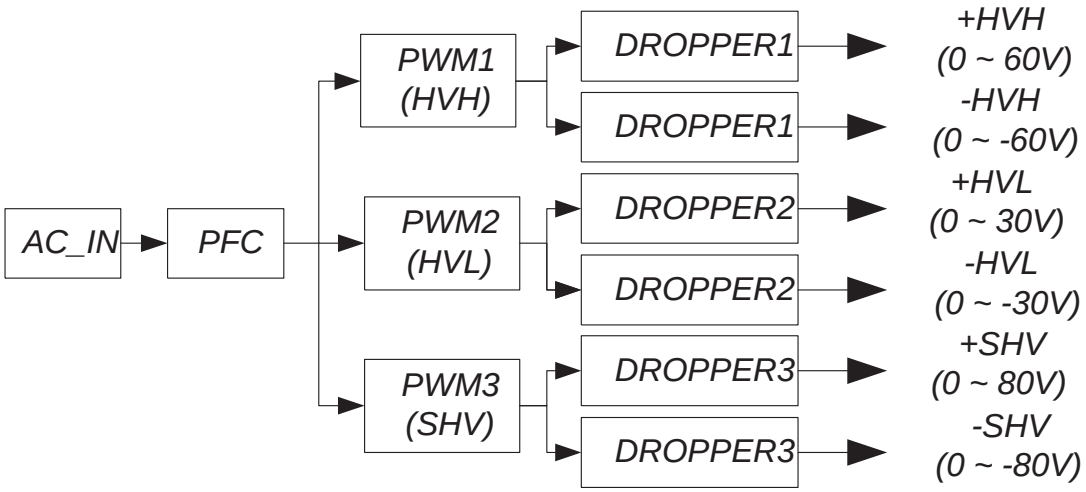


Figure 5-11 HV Unit Block Diagram

5-4-7-1 Overview

AC110V is supplied to the HV unit via AC Box > Transformer > SSR. This is applied to the PFC, inside the HV unit. The PFC convert AC100V to DC400V, and DC voltage is applied to DC/DC, then to HVH, HVL, and SHV using dropper. They convert DC voltage to proper voltage to be outputted.

5-4-7-2 Specifications

DC Output Capacity:

- HVH : +/- 0V to +/- 60V variable, Max. 110W, Max. 2A
- HVL : +/-0V to +/- 30V variable, Max, 70W, 1A
- +SHV: +80V +/- 5%, 80mA
- -SHV: -80V +/- 5%, 80mA

5-4-7-3 Output Signal to FEC

The following signals are sent to FEC via BACKPLANE board.

- OV(Over Voltage), OC(Over Current) of each power source : HV tests in itself. The result transmits the FEC via BACKPLANE ASSY.

5-4-7-4 Input Signal from FEC

The following signals are sent to HV unit via FEC > BACKPLANE board.

- +5V, +/- 15V, HV STOP: These signals are sent to PFC to control DC voltage output of HVH, HVL, and -SHV. Normally HVSTOP is ON
  - HVH Ref, HVL Ref: These are the digital signals (8 bits) sent to the DAC of HVH or HVL from FEC. Consequently, The DC Voltage (0 - 60V) is outputted from HV unit.

Section 5-5
Backend Processor

5-5-1 BEP with Intel Motherboard

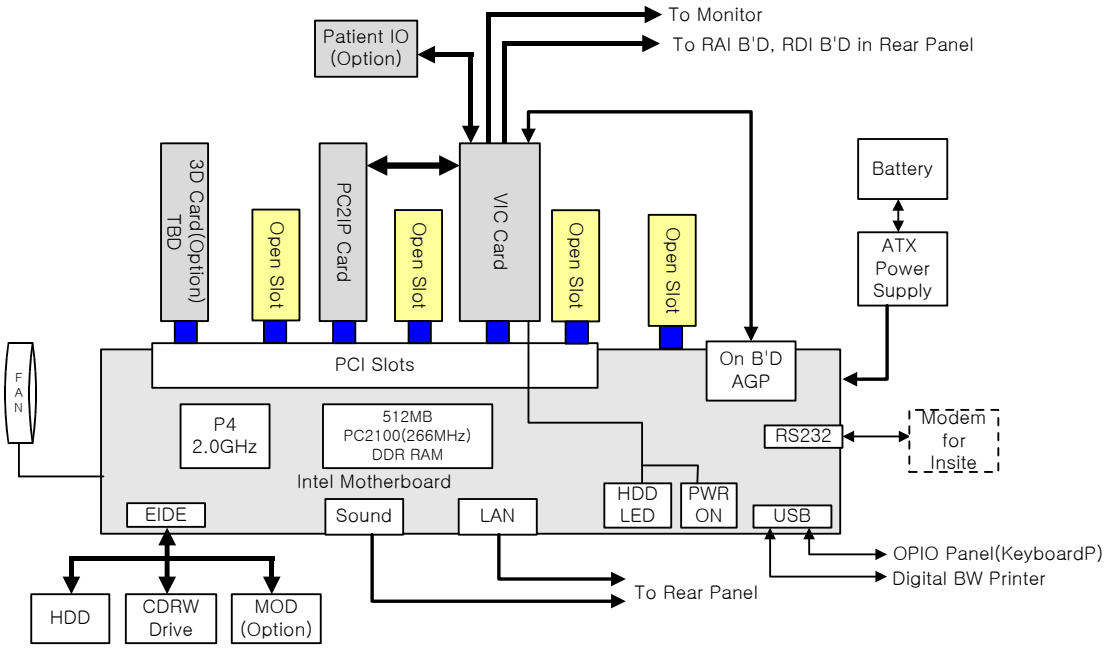


Figure 5-12 BEP with Intel Motherboard

The Backend Processor processes the data from front end block and stores it in The main memory and performs scan image reconstruction to display on monitor Backend Processor(BEP) include ATX smps and UPS battery, motherboard for P4 And Pentium 4 CPU. Main memory capacity is 512Mbytes and the type of memory is DDR266. The BEP motherboard have capability of AGP graphic functionality and sound and Ethernet functionality in itself. So this motherboard no need additional AGP video Card and sound card, Ethernet card. So each slot on motherboard are used for followings

- AGP card Slot : Open
- PCI Slot #1 : Open
- PCI Slot #2 : VIC Card
- PCI Slot #3 : Open
- PCI Slot #4 : PC2IP Card
- PCI Slot #5 : Open
- PCI Slot #6 : Open (Option for Flock of Bird 3D card in future)
- Storage Device :
- Hard Disk Drive
- CD R/W Drive
- Optional MO Drive

5-5-2 VIC Card

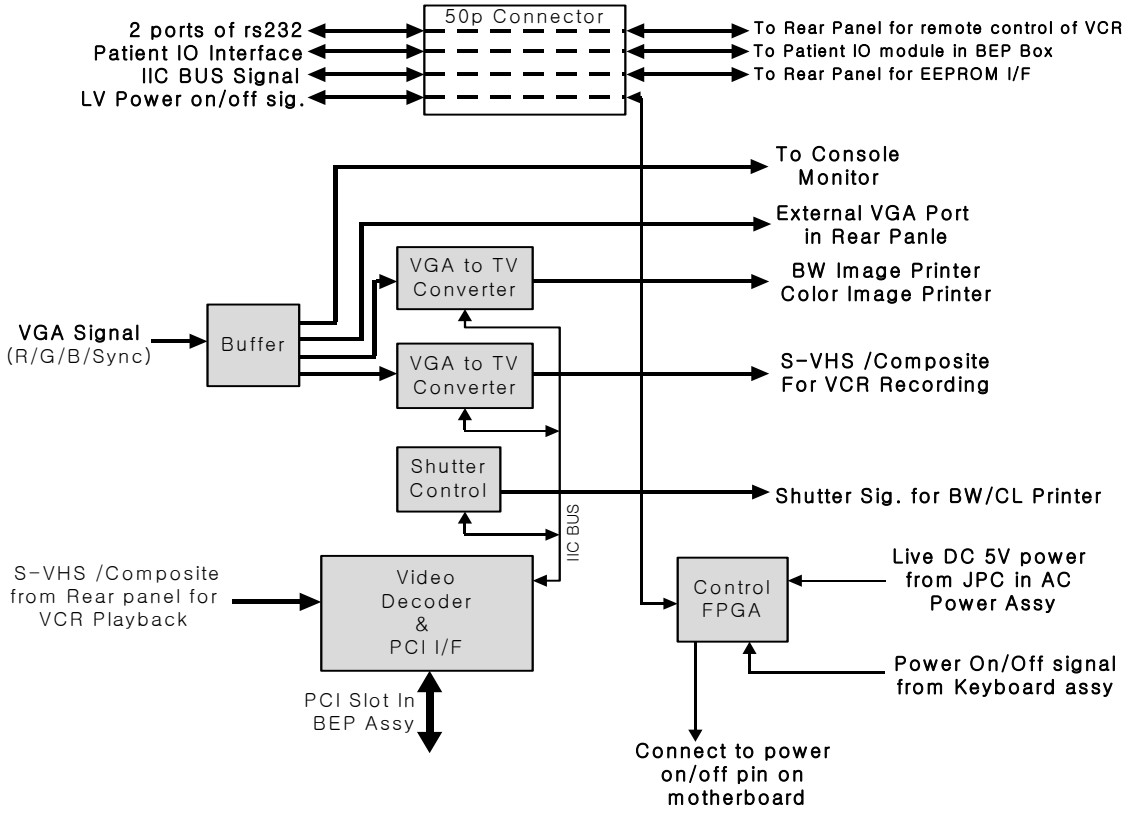

50p Connector
2 ports of rs232
Patient IO Interface
IIC BUS Signal
LV Power on/off sig.
To Rear Panel for remote control of VCR
To Patient IO module in BEP Box
To Rear Panel for EEPROM I/F
To Console Monitor
External VGA Port in Rear Panle
VGA to TV Converter
BW Image Printer Color Image Printer
VGA Signal (R/G/B/Sync)
Buffer
VGA to TV Converter
S-VHS /Composite For VCR Recording
Shutter Control
Shutter Sig. for BW/CL Printer
IIC BUS
S-VHS /Composite from Rear panel for VCR Playback
Video Decoder & PCI I/F
Control FPGA
Live DC 5V power from JPC in AC Power Assy
Power On/Off signal from Keyboard assy
PCI Slot In BEP Assy
Connect to power on/off pin on motherboard

Figure 5-13 VIC Card

VIC Card perform video conversion operations and Power on/off control.

- Video Decoder : Video decoder convert S-VHS or composite video analog signal to digital RGB data and send the RGB digital data into BEP main memory on motherboard through PCI bus. And then this video digital data is displayd on console monitor. Video analog signal comes from rear panel. This video decoder also have IIC bus interface logic.
- VGA to TV Convertor : This device convert the VGA display signal to TV display signal for B/W printer and color printer and VCR recording.
- Shutter Control CPLD : Shutter signals for analog B/W printer and color printer are generated by this CPLD. And this CPLD is controlled by video decoder via IIC bus.
- Power Control FPGA : This FPGA generates power on/off signal. This device is alive always by live DC power which comes from JPC assy in AC Power Assy. So this device monitor the ststus of power on/off switch on the keyboard. If power switch will be pushed once, this device turn on the LV power supply in AC power assy and after few seconds, turn on the BEP assy.

5-5-3 Patient I/O (Option)

The optional Patient I/O is mounted at the front of the BEP chassi.

Available inputs:

- PCG
- ECG
- AUX1
- AUX2

Section 5-6
Top Console

The Top Console includes a On/off switch, a keyboard, different controls for manipulating the picture quality, controls for use in Measure & Analyze (M&A), and loudspeakers for stereo sound output (used during Doppler scanning, inside the CRT monitor cover).

5-6-1 KEYBOARD

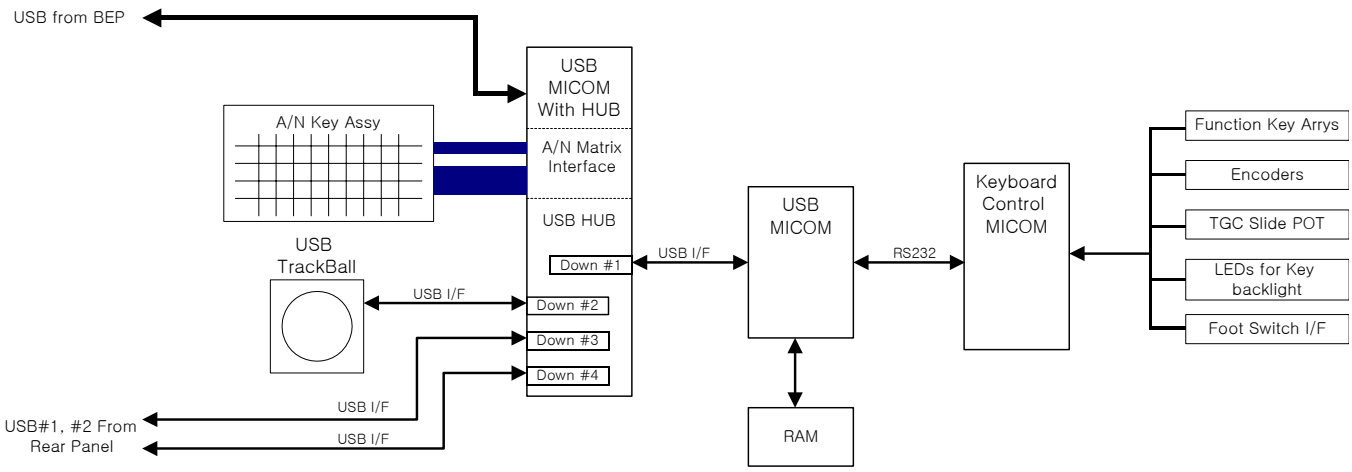


Figure 5-14 Keyboard

Keyboard assy provide all of operator interface for scan.Keyabord assy consist of several pieces of main function assembly.

- HUB Assy : The HUB assy have usb interface for upstream usb port which comes from BEP. HUB assy also have alpha numeric key interface and control functions and usb hub. So usb trakcball and the usb of main assy and additional 2 usb ports in rear panel are connected to
- MAIN Assy : Main assy have usb micom for interface between main assy and usb hub assy. All of function key and encoders interface and controls are done by additional control on chip microcomputer

5-6-2 LCD Assy : LCD Assy displays menu screen and touch sensor recognize of touch

15 inch high resolution RGB monitor with non interlace scan includes loudspeakers for stereo sound output and microphone to record talking of operator. Monitor have also task lamp to light up the A/N key on keyboard assy

Figure 5-15 LOGIQ 5 Monitor

Section 5-7
External I/O (Rear Panel)

The External I/O is the interface between the scanner and all external items, located at the rear side of the scanner.

Examples: InSite, TCP/IP network, Printer, etc.

Rear Panel assy consist of 2 assy, RAI and RDI. RAI means Rear Analog Interface and RDI means Rear Digital Interface.

5-7-1 Input/Output Signals for peripheral

Table 5-14 Input Output signals for peripherals

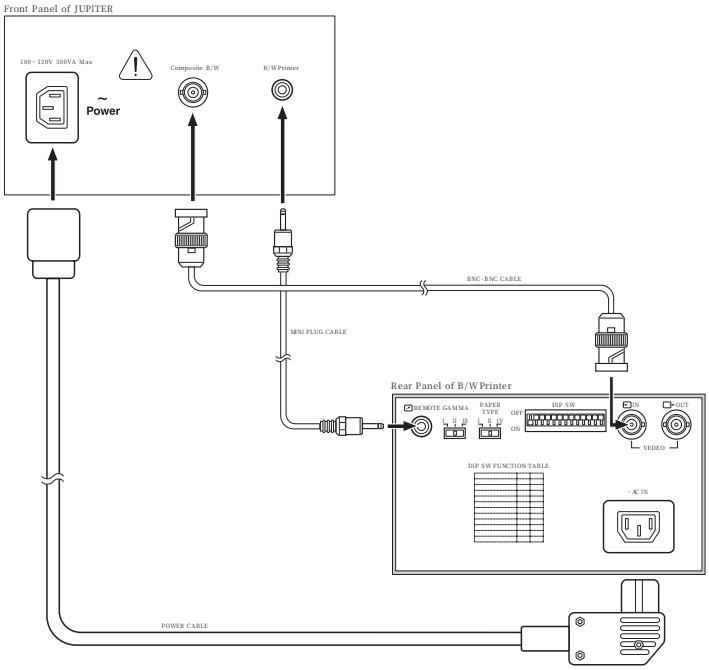
Signal Name	Description	Connection from/via/to
R/G/B/Sync for Color Printer	RGB and Sync signal output for analog color printer. 1.0Vp-p, 75ohms, unbalanced	VIC -> RAI-> BNC Connector
Cmpsit In for Color Printer	Composite input from Color printer for diagnostic purpose(TBD)	BNC connector -> RAI -> VIC
Shutter output for Color printer	Exposure control signal for color printer	VIC -> RDI -> Mono jack
Remote	RS232 port for remote control of Color printer	PC2IP -> VIC -> RDI -> 9P DSUB connector
Composite In / S-VHS In for VCR	Composite VCR input and S-VHS input signal for VCR playback	BNC connectror-> RAI -> VIC
Audio L In/Audio R In for VCR	Stereo audio input from VCR for VCR playback	RCA Jack-> RAI -> Sound card in BEP
Composite Out / S-VHS out for VCR	Composite VCR output and S-VHS output signal for VCR Recording	VIC -> RAI -> SVHS connector
Audio L Out/Audio R Out for VCR	Stereo audio out for VCR Recording	Sound card in BEP -> RAI -> RCA Jack
Remote	RS232 port for remote control of VCR operation	PC2IP -> VIC -> RDI -> 9P DSUB connector
Composite out for BW printer	Composite video signal output for BW printer 1.0Vp-p, 75ohms, unbalanced	VIC -> RAI -> BNC connector
BW Shutter	Shutter control signal for BW printer	External -> RAI -> Mono Jack
Foot Switch	Foot switch is mechanical switch that connect a signal to ground	Foot switch connector-> RDI -> Keyboard
External VGA	VGA singal output for external VGA monitor	Graphic card in BEP -> VIC -> RAI -> RDI -> 15P DSUB connector
Ethernet	Standard TCP/IP Ethernet	BEP -> RDI -> RJ45 conn.
Phone Line	Telephone line of Modem for insite	Phone jack -> RDI -> Modem

5-7-2 Peripherals and Cable connection

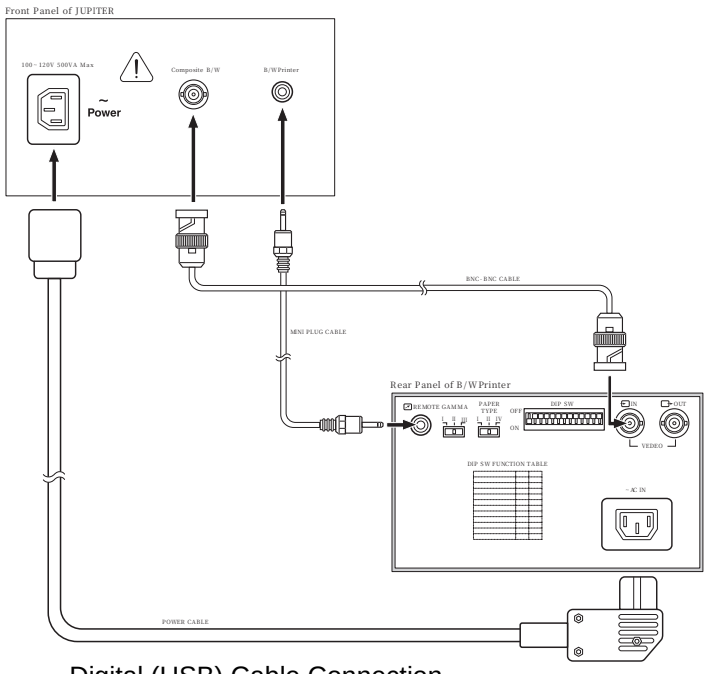
A VCR, a Black & White Video Printer and a Color Printer may be installed onboard the scanner. These devices are connected to the External I/O (Rear Panel) or Front Panel in the case of B/W Printer.

5-7-2-1 B/W Printer Cable Connection (Analog and Digital)

Connect the Power cable, mini plug cable, and the BNC-BNC cable between the B/W Video Printer and the console as shown in Figure 5-16 on page 5-19 .



Analog Cable Connection



Digital (USB) Cable Connection

Figure 5-16 Cable Connection - USB Cable and Analog Connection Method

5-7-2-2 Cable Connection - Color Printer

Connect the cables listed below between the Color Printer and the console.

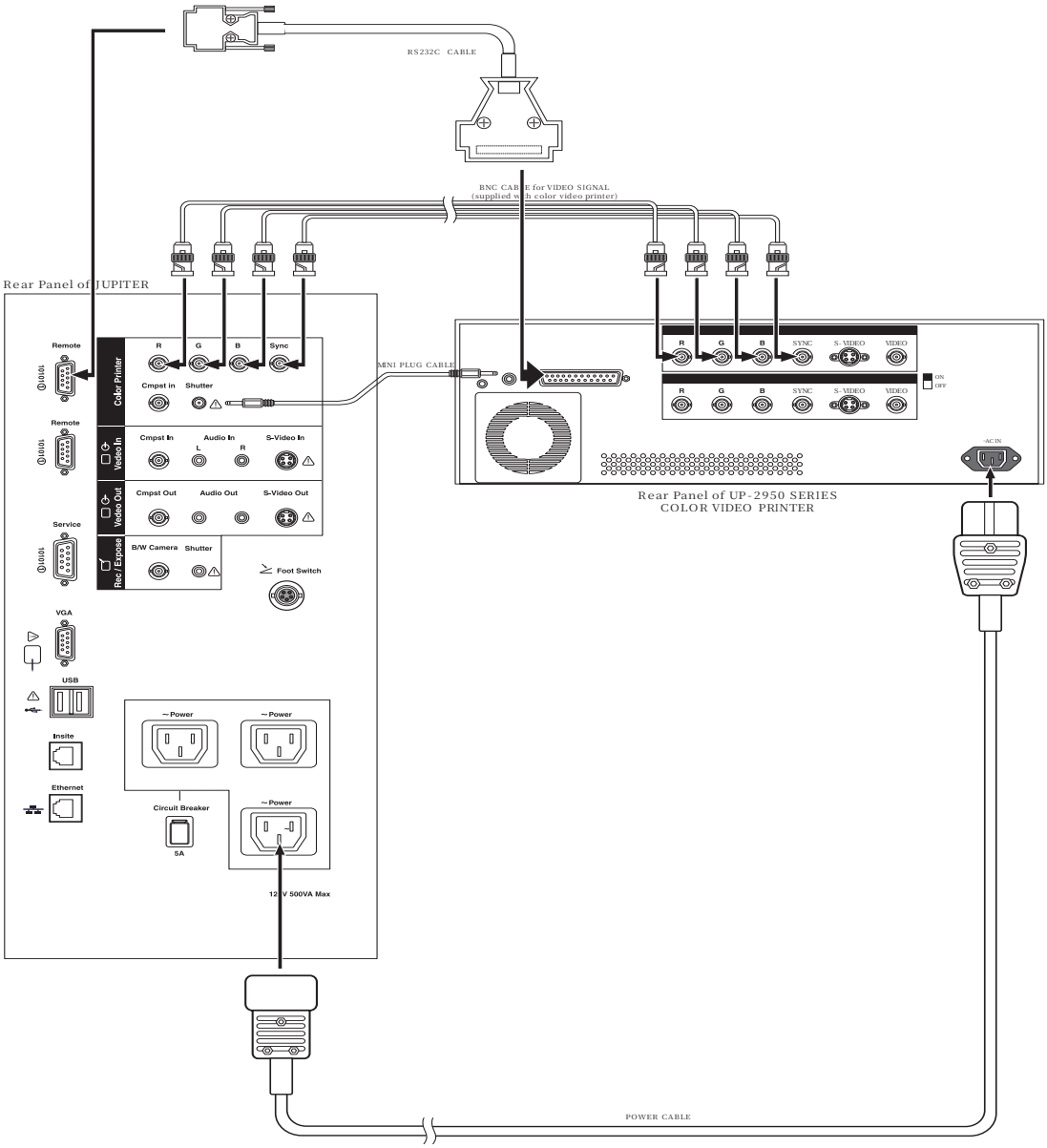


Figure 5-17 Cable Connection between Color Printer and Console

NOTE: Equipment damage possibly. Be sure to use the following recommended connecting cables to connect recording devices and a network with LOGIQ™ 5 console.

5-7-2-2 Cable Connection - Color Printer (cont'd)

Connect the cables listed below between the Color Printer and the console.

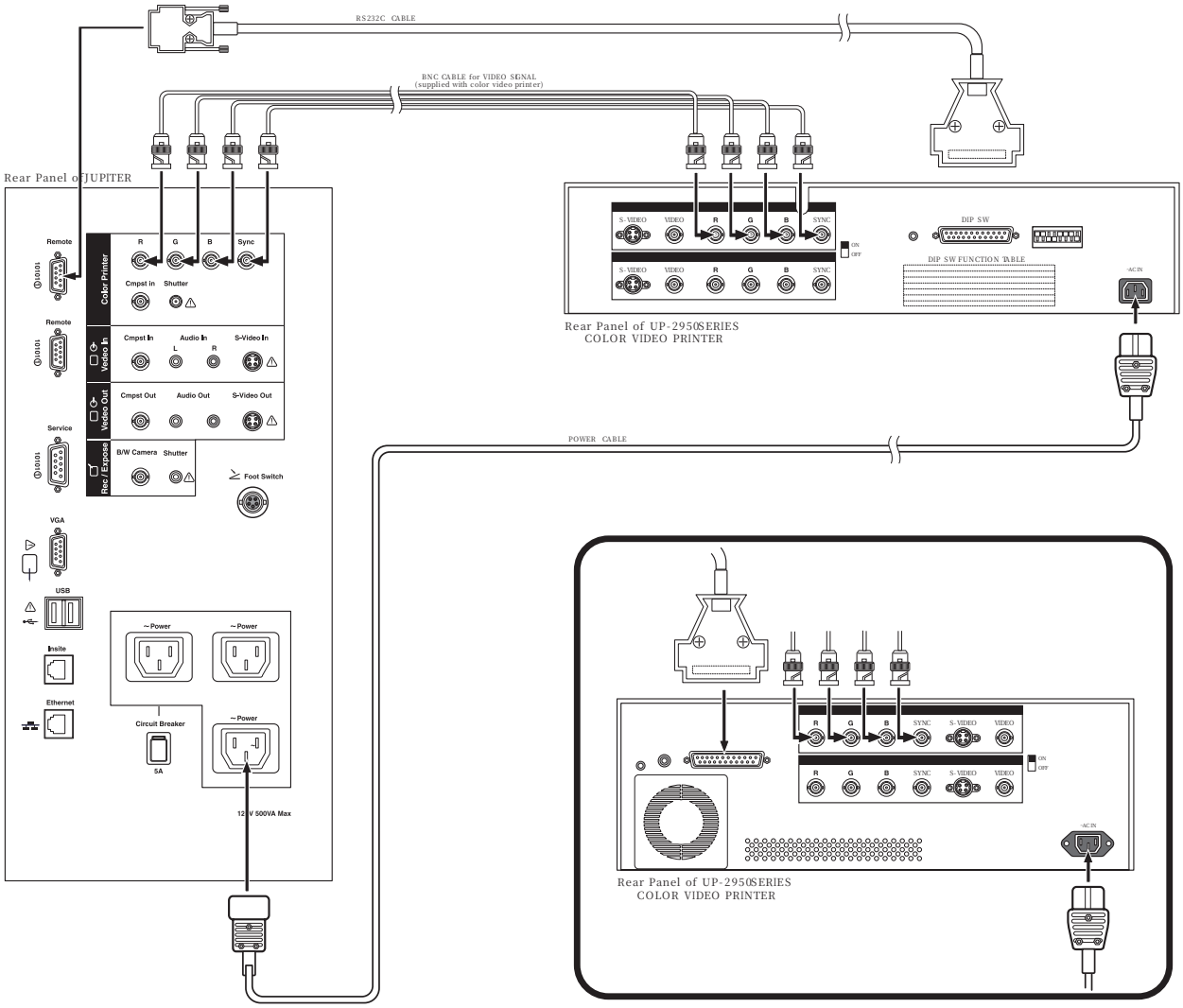


Figure 5-18 Cable Connection between Color Printer and Console

5-7-2-2 Cable Connection - Color Printer (cont'd)

Connect USB cable listed below between the SONY UP-D21MD Color Printer and the console.

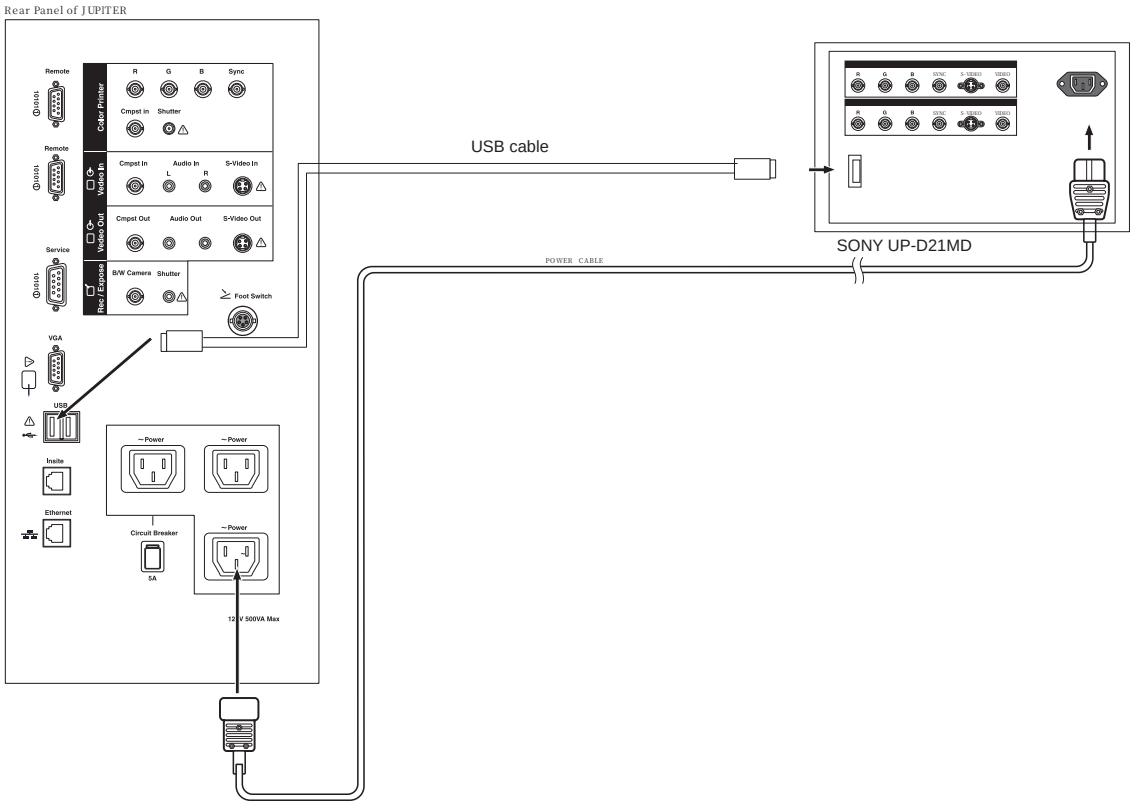


Figure 5-19 USB Cable Connection between Color Printer and Console

5-7-2-3 Cable Connection- VCR

Connect the cables listed below between the Sony VCR and the console.

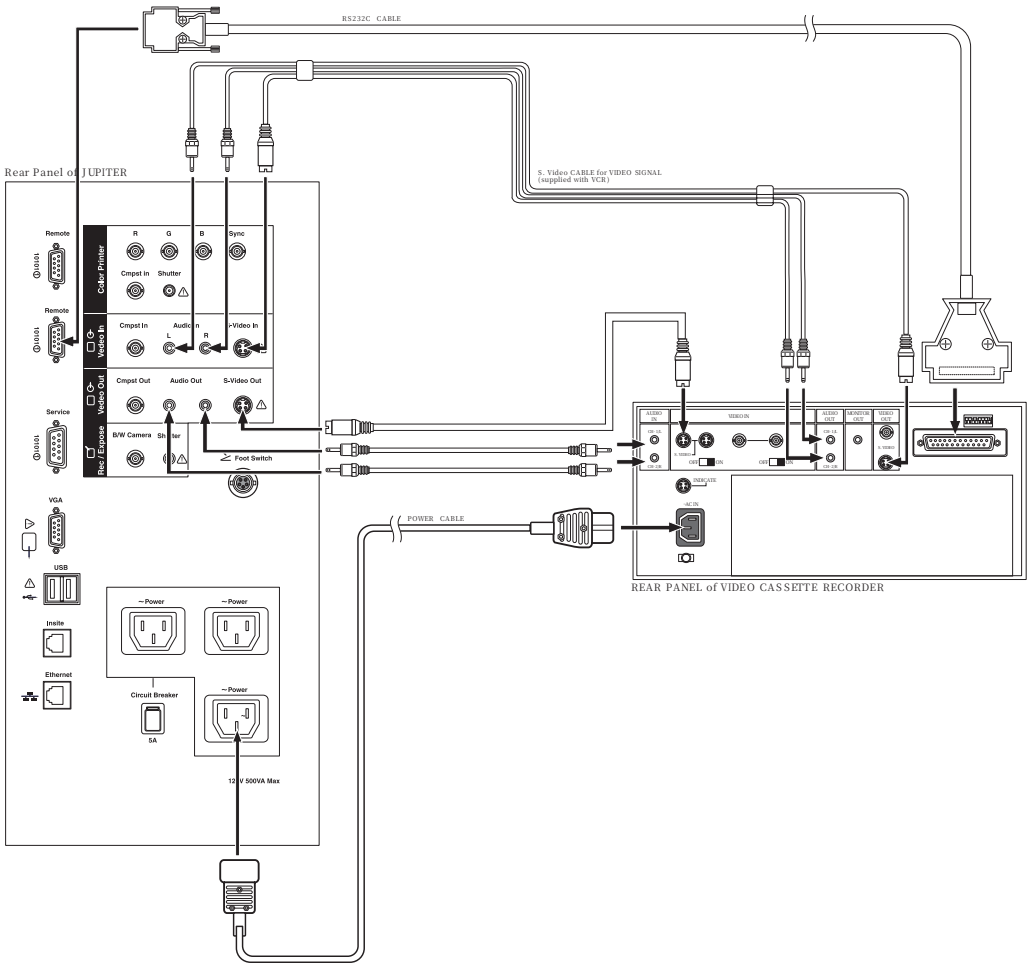


Figure 5-20 Cable Connection between VCR and Console

5-7-2-3 Cable Connection- VCR (cont'd)

Connect the cables listed below between the Pansonic VCR and the console.

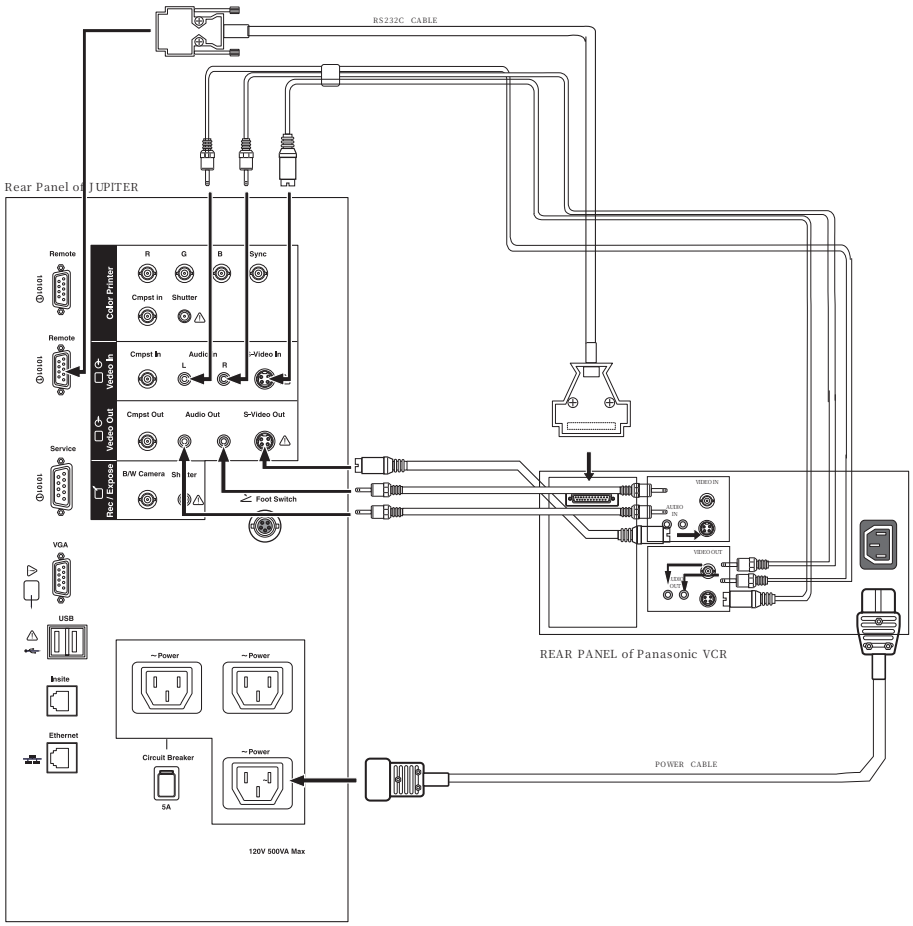


Figure 5-21 Cable Connection between VCR and Console

Equipment damage possibly. Be sure to use the following recommended connecting cables to connect recording devices and a network with LOGIQ™ 5 console.

5-7-3 Interconnect Cabling

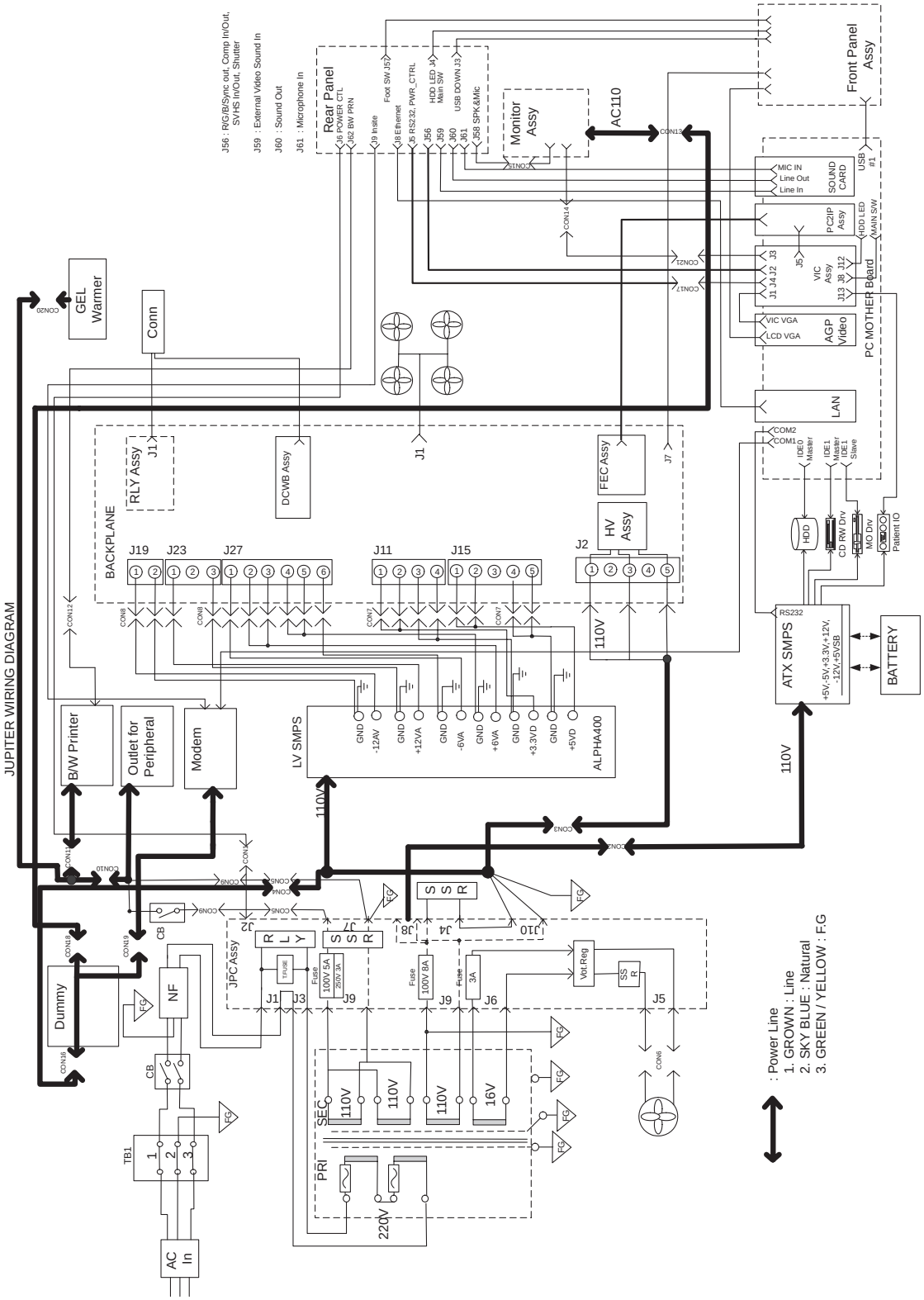


Figure 5-22 Cable Interconnect Diagram

Section 5-8
Power Diagrams

5-8-1 Overview

The AC Power assy's main tasks are to supply the various internal subsystems and to galvanically isolate the scanner from the on site Mains Power System and to control power on/off . The voltage to peripherals can be confederated to either 110 VAC or 220 VAC.

5-8-2 AC Power

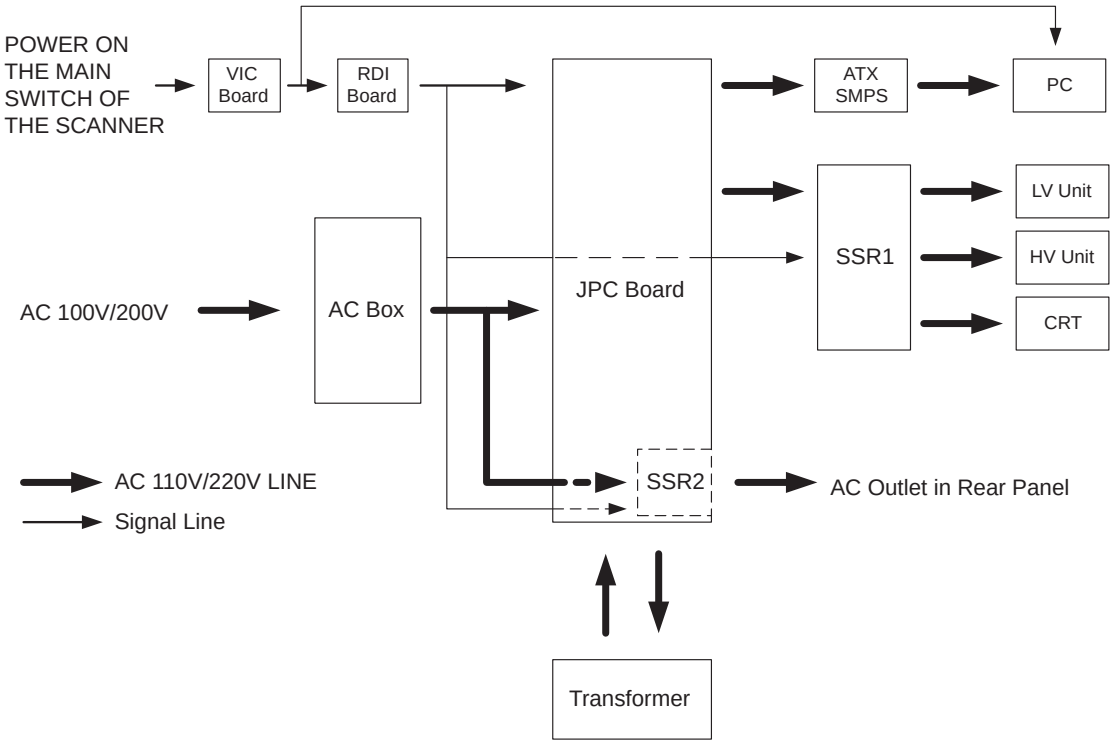


Figure 5-23 AC Power Distribution Block Diagram

The mains cord has plugs in one side end. A male plug connects to the mains outlet on site.

The mains voltage is routed to the Main Circuit Breaker, located on the rear of the system.

The Main Circuit Breaker is of the auto fuse type, if for some reason the current grows to high, the switch will automatically break the power.

From the Main Circuit Breaker, the AC power is routed via an Inrush Current Limiter to a internal outlet connector for the Mains Transformer.

The Transformer is the galvanic barrier between the rest of the scanner and the on site AC Mains. Input voltage to the transformer can be either 220 VAC or 110 VAC.

AC output of transformer is supplied to the ATX PS (BEP Power supply, located on the BEP chassi) directly , but to the HV unit and CRT Monitor and LV unit and peripheral outlet via SSR.

SSR for AC power net are controlled by JPC assy in AC POWER assy and VIC assy in BEP assy.

5-8-3 DC Power (Low Voltage)

DC Power are supplied by LV unit in AC Power assy. DC Power of LV unit are power source of all assys in nest and nest fan, etc

JPC assy in AC power assy is DC power source also. DC power of JPC is for on/off control circuit of VIC assy in BEP assy

DC Output Capacity:

- +3.3V, 5.6A
- +5V, 7A
- +6V, 8.7A
- +6V, 8.7A
- -6V, 3.4A
- +15V, 8A
- -15V, 1A

5-8-4 Rear Panel

5-8-4-1 Block Diagram

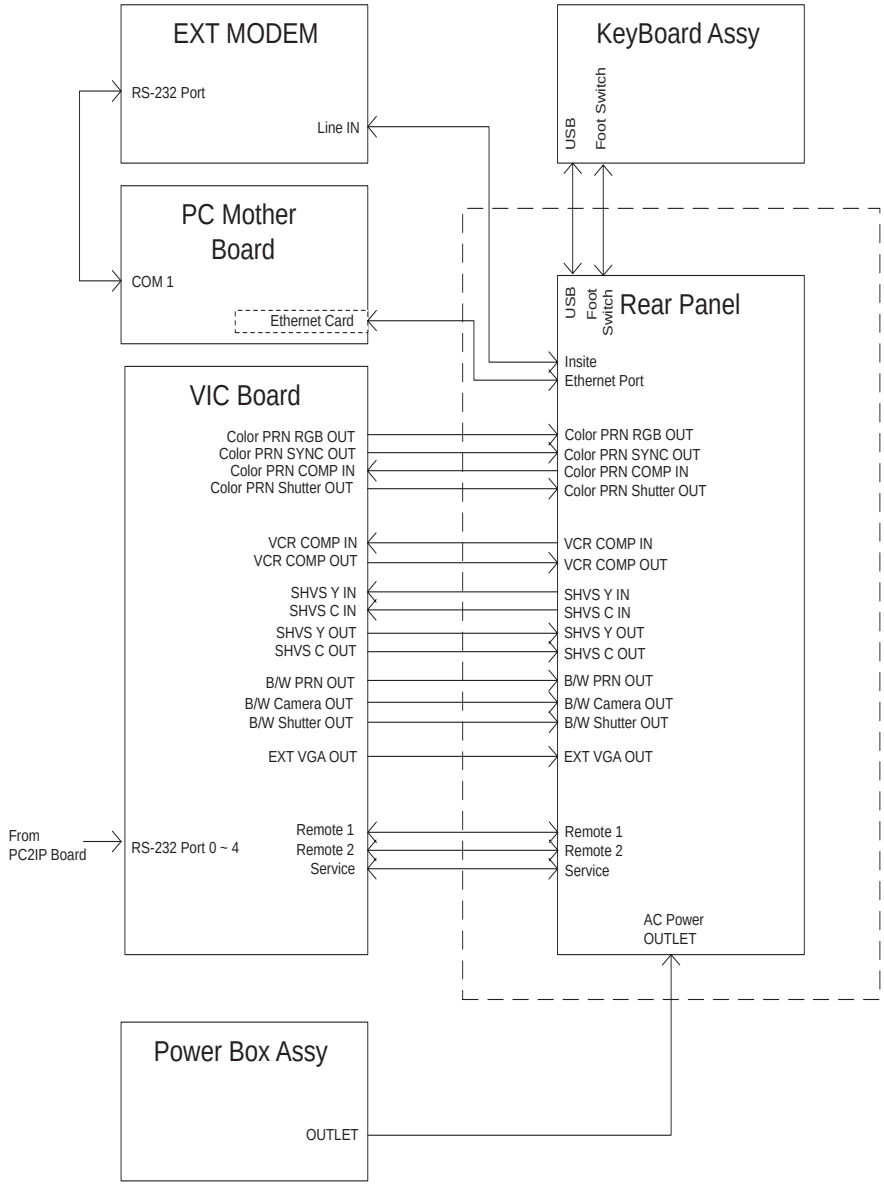


Figure 5-24 Rear Panel Block Diagram

The REAR ASSY and REAR CONN 220V ASSY are the rear-panel assemblies which interconnect external signals and power with the LOGIQ 5 system. Both of the assemblies are the same except the circuit breaker's current ratings depending on voltage of the system power source (See Safety described below).

5-8-4-2 Safety

- Circuit Breaker

Table 5-15 Circuit Breaker Specification

Assembly	Power Voltage Rating (V)	Peripheral Current Rating (A)	Trip Time	Reset Time
REAR CONN	110	5.0	1 hour max. @ 5.4A, 25 degreeC	60 seconds
REAR CONN 220V	220	3.0	1 hour max. @ 3.5A, 25 degreeC	180 seconds

- Electrical Isolation
  The rear-panel's Insite (modem) interface is electrically isolated from the system's internal circuit. The isolator's dielectric strength should be 500VAC RMS or higher within 1 minute (in compliance with IEC60601-1-1).

5-8-4-3 Camera (Printer) Remote Control Interface

The Rear-panel has two remote control interface terminals for B/W and color printers.

Table 5-16 Camera (Printer) Remote Control Interface Specifications

	Level (V)	Active Polarity	Retention Time
Color camera (shutter) control	H:2.0/L:0.8	L	60 msec
B/W camera (printer) control	H:2.0/L:1.0	L	100 msec

Section 5-9
Air Flow

5-9-1 Air Flow Distribution

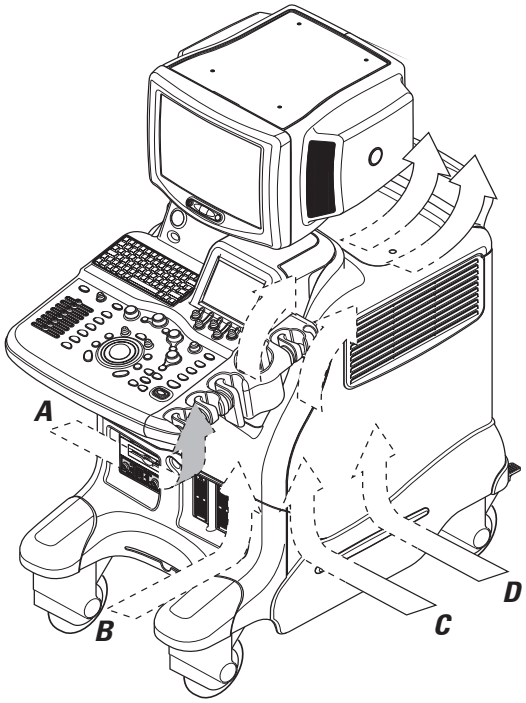


Figure 5-25 Air Flow Inside the Scanner

The four air flow passes allow the scanner to be cooled down as shown in the figure above.

- Pass A (Bottom right> BEP Assy> Rear upper left) for BEP Assy cooling.
- Pass B (Front lower left > Filter > LV unit > Rear lower left) for HV unit cooling.
- Pass C (Bottom left> RLY Box Assy > Rear upper right) for RLY Box Assy cooling.
- Pass D (Bottom left> Filter >Nest Assy> Rear upper right) for Nest Assy cooling.

5-9-2 Filters

The scanner contains the four filters located at:

- Front bottom for air flow of the BEP Assy and Nest Assy.
- Rear bottom for air flow of BEP Assy.
- Left and Right side for airflow of the AC power Assy.

5-9-3 Fans

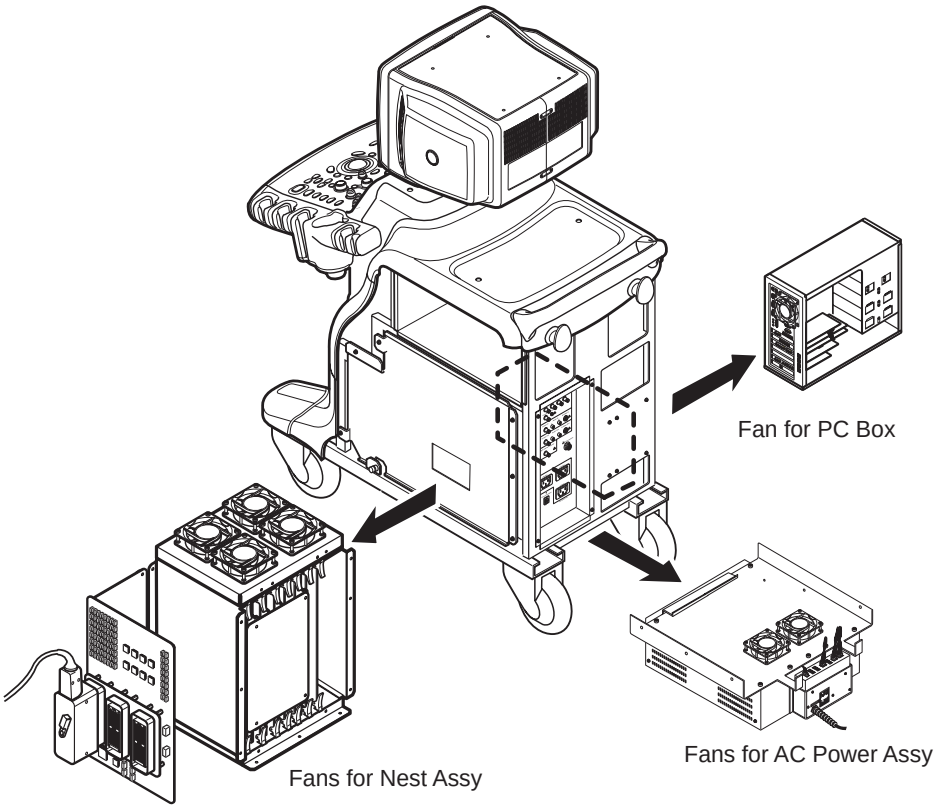


Figure 5-26 Fans

The scanner contains the eight fans at the following positions for producing an air flow.

- One fan: Insde the LV unit for air flow pass C
- One fan: On the BEP assy for air flow pass B
- Four fans: At the top of the NEST Assy for air flow pass A, C.
- Two fans: at the top of the AC Power assy for air flow pass A, C

Section 5-10
Service Platform

5-10-1 Introduction

The Service Platform contains a set of software modules that are common to all ultrasound and cardiology systems containing a PC backend. This web-enabled technology provides linkage to e-Services, e-Commerce, and the iCenter, making GE's scanners more *e-enabled* than ever. The Service Platform will increase service productivity and reduce training and service costs.

5-10-2 Global Service User Interface (GSUI)

5-10-2-1 Internationalization

The user interface provided by the service platform is designed for GE personnel and as such is in English only. There is no multi-lingual capability built into the Service Interface.

5-10-2-2 Service Login

Select the wrench icon in the status bar at the bottom of the scan display screen.

This icon links the user to the service login screen.

Figure 5-27 Login Screen for Global Service User Interface

5-10-2-3 Access / Security

The service interface has different access and security user levels. Each user is only granted access to the tools that are authorized for their use.

Table 5-17 Service Login User Levels

User Level	Access Authorization	Password
Operator	Authorized acccess to specified diagnostics, error logs and utilities. Same acquisition diagnostic tests as GE Service.	uls
Administrator		uls
External Service		gogems

Every access request, whether successful or not, will be logged into a service access log that is viewable to authorized users.

5-10-3 Service Home Page

The navigation bar at the top of the screen allows the user to select from several tools and utilities.

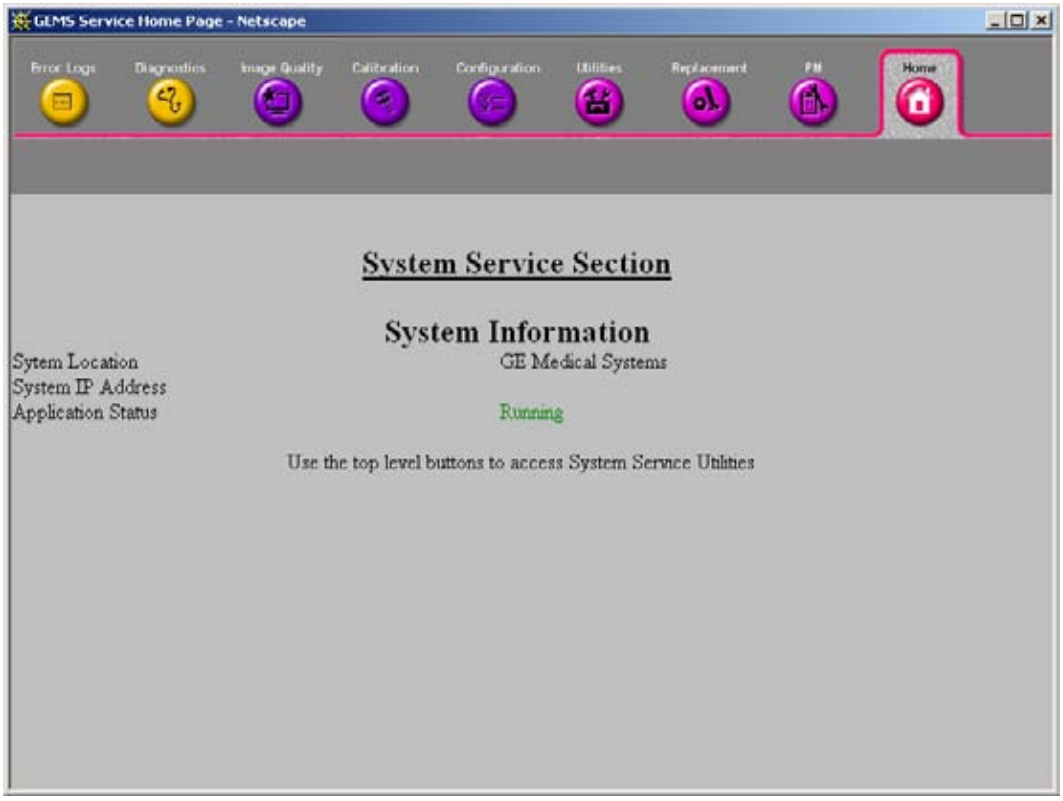


Figure 5-28 Customer Service Home Page

5-10-4 Error Logs Tab

From the Error Logs Tab the Log Viewer displays four categories with pull-down sub-menus and an Exit selection. The Service Interface allows scanner logs to be viewed by all service users.

The **Filter** Error log is not available to customer level analysis.

The log entries are color-coded to identify the error level severity at a glance.

Table 5-18 Log Entry Key

Severity	Error Level	Color Code
1	Information	Green
2	Warning	Blue
3	Error	Red

The Service Interface supports the transfer of these logs to local destinations such as the MOD, and CD-ROM drive.

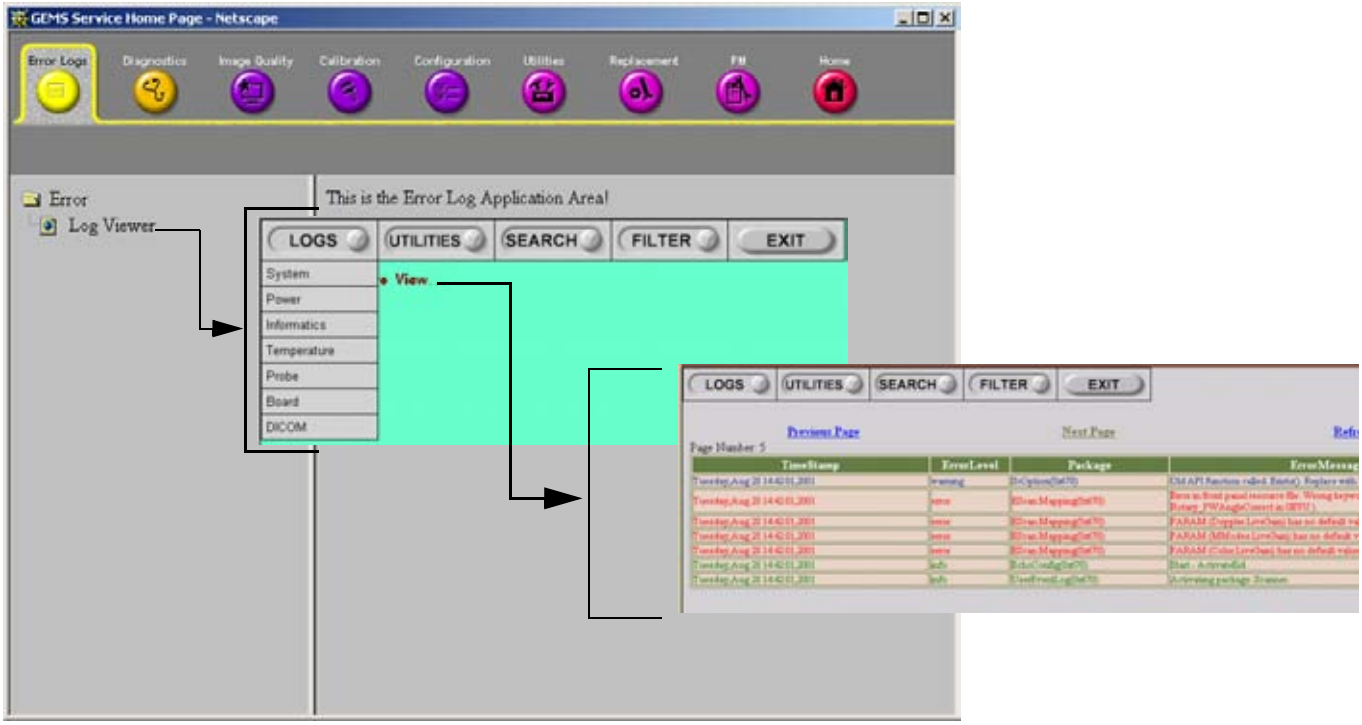


Figure 5-29 Log Viewer / Logs / Log Entries

5-10-4-1 Logs

The seven sub-menus of the Logs category are System, Power, Infomatics, Temperature, Probe, Board, and DICOM.

*NOTE: Figure 5-29 provides a graphical example of the log entries for the **System Logs**.*

Log table headings for the differrent logs are as follows:

- **System**

  Log entry headings include Time Stamp; Error Level; Package; and Error Message.

- **Power**

  Log entry headings include Time Stamp; Error Level; Package; and Error Message.

- **Infomatics**

  Log entry headings include TimeStamp, Revision, PtID, PtDOB, PtSex, PtWeight, PtHeight, ExamID, Exam Category, ExamCurDate, and ExamStartTime.

- **Temperature**

  Log entry headings include Time Stamp; Error Level; Package; Upper FEC Sensor; and Lower FEC Sensor.

- **Probe**

  Log entry headings include Time Stamp; Error Level; Package; Error Message; Severity; Revision; and three (3) new labels that have not yet been named.

- **Board**

  Log entry headings include Time Stamp; Error Level; Package; Board; Severity; and two (2) new labels that have yet been named.

- **DICOM**

  Log entry headings include Time Stamp; Error Level; Package; and Error Message.

5-10-4-2 Utilities

The two sub-menus of the **Utilities** category are Plot Log, and Plot Page.

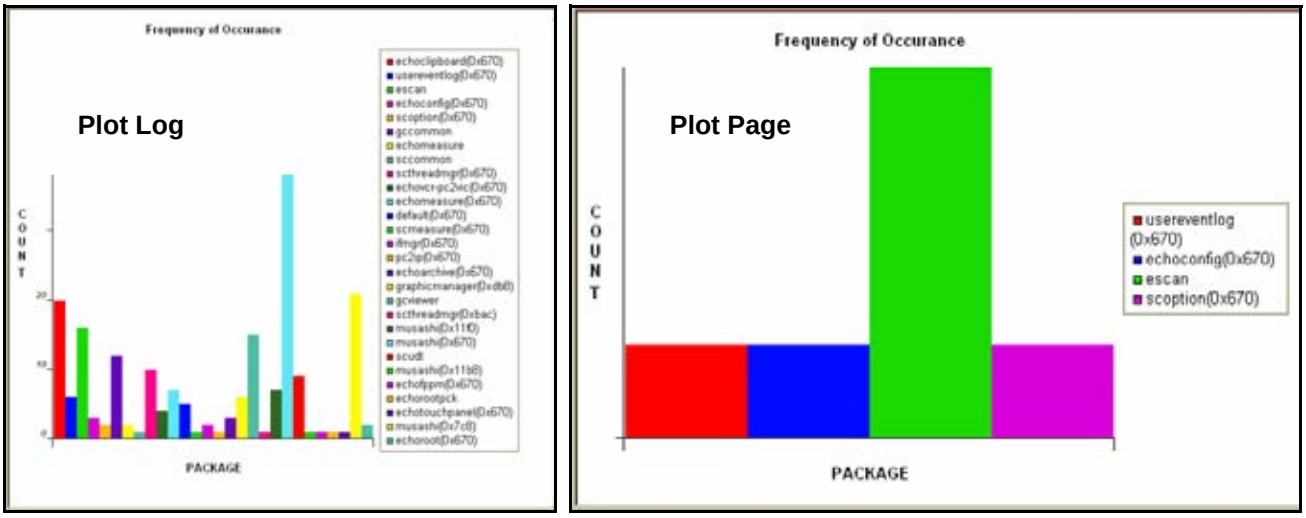


Figure 5-30 Utilities Sub-Menus

- **Plot Log**

  Allows for the color coded plot of all Log contents with the package on the ‘x’ axis and incident count on the ‘y’ axis.

- **Plot Page**

  Allows for the color coded plot of all Page contents with the package on the ‘x’ axis and incident count on the ‘y’ axis.

5-10-4-3 Search

On the Text Search sub-menu of the **Search** category, users enter case-sensitive text they wish to find. This filter field works well for filtering the Sys log file for the word “fail”.

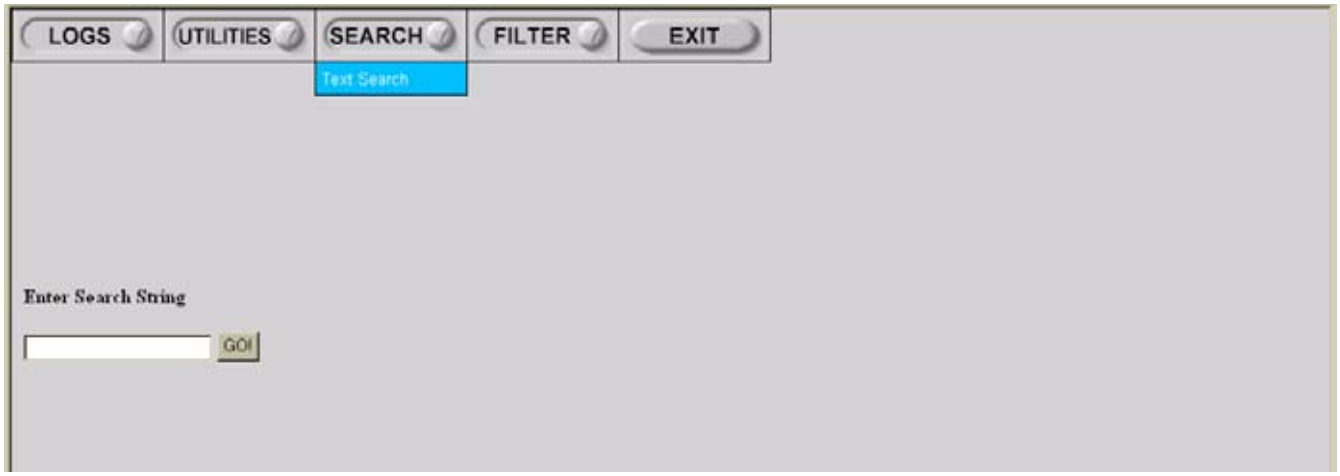


Figure 5-31 Search Sub-Menu

5-10-4-4 Exit

The sub-menu, **Exit Log Viewer**, returns the user to the Service Desktop home page.

Figure 5-32 Exit Log Sub-Menu

5-10-5 Diagnostics

Detailed **Diagnostic** information is found in 7 Diagnostics/Troubleshooting.

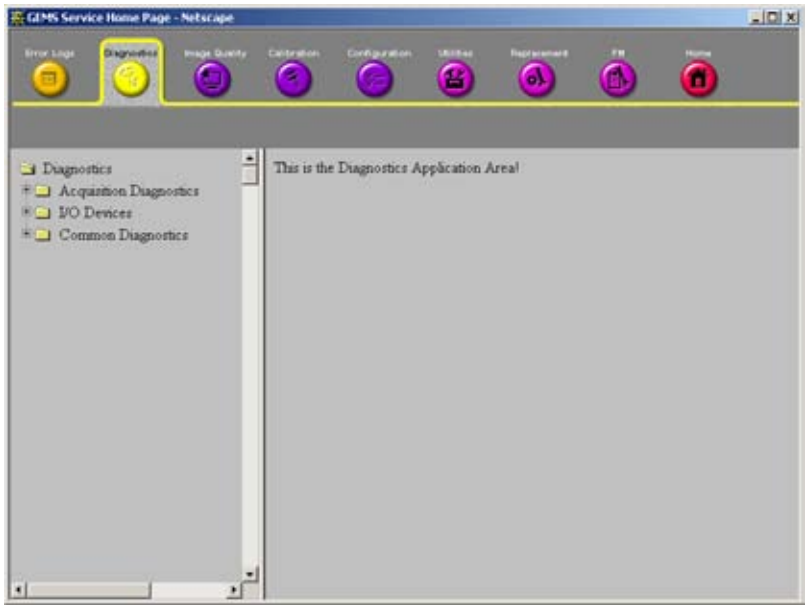


Figure 5-33 User Diagnostic Page

5-10-5-1 Diagnostics Execution

Diagnostic tests are executable by both local and remote users. The Service Platform provides top-level diagnostic selection based on the user's level and login access permissions. Remote access will require disruptive diagnostic permissions to run Acquisition diagnostics.

5-10-5-2 Diagnostic Reports

Diagnostic tests return a report to the Service Platform. The platform retains the report and allows for future viewing of the diagnostic logs.

5-10-6 Image Quality

The **Image Quality** page is intended to contain tools for troubleshooting image quality issues.

Figure 5-34 Image Quality Page

5-10-7 Calibration

The **Calibration** page is intended to contain the tools used to calibrate the system.

Figure 5-35 Calibration Page

5-10-8 Configuration

The **Configuration** page is intended to be used to setup various configuration files on the system.

The Service Platform is the access and authorization control for remote access to the configuration subsystem.

The enable/disable of software options can be done from this Configuration page.

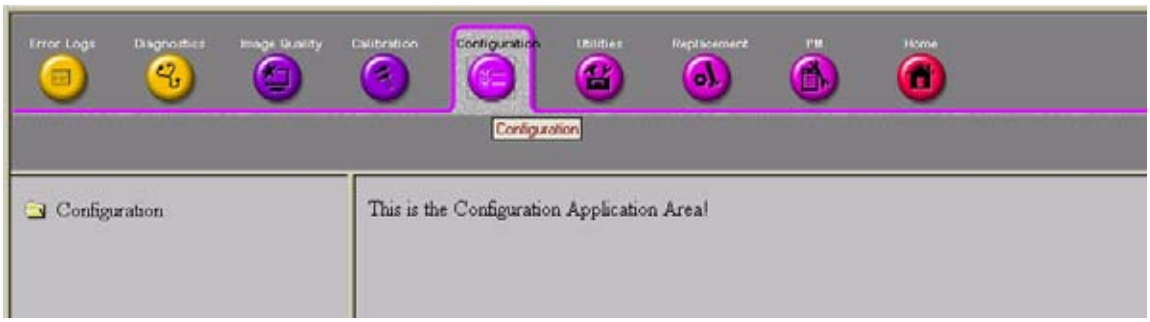


Figure 5-36 Configuration Page

5-10-9 Utilities

The **Utilities** page contains several miscellaneous tools.

Figure 5-37 Customer Utilities Page

5-10-10 Replacement

The **Replacement** page is intended to contain the tools used to track replacement parts used in the system.

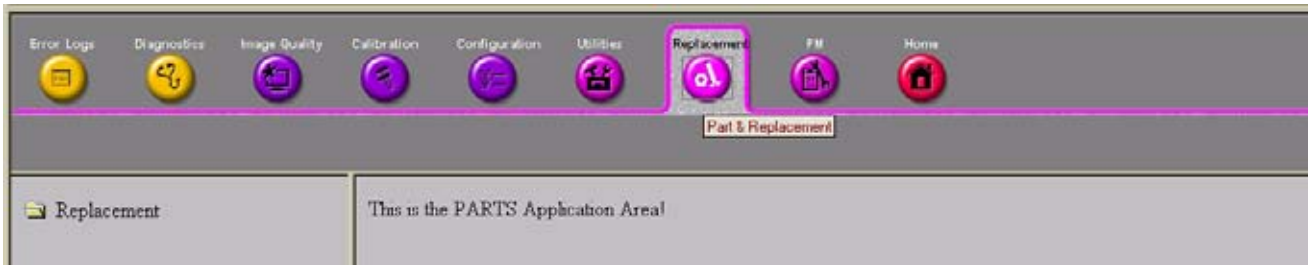


Figure 5-38 Part Replacement Page

5-10-11 PM

The **PM** page is intended to contain the tools used in periodic maintenance of the system.

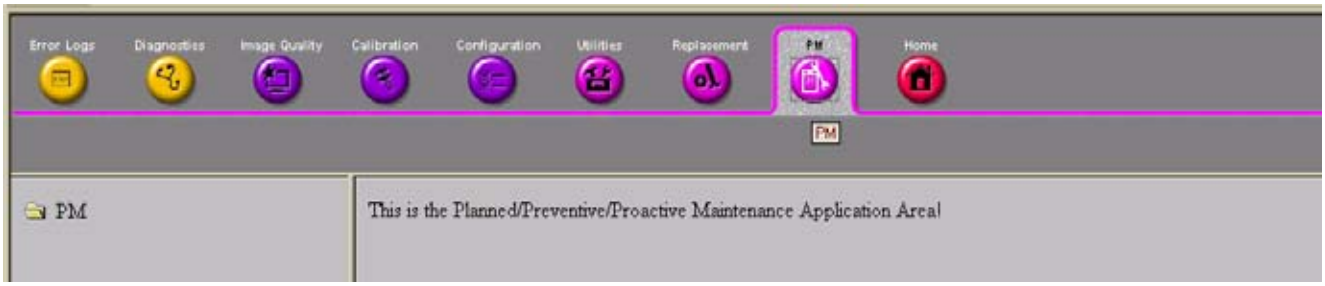


Figure 5-39 Planned Maintenance Page

Chapter 6
Service Adjustments

Section 6-1
Overview

6-1-1 Purpose of this chapter 6

This section describes how to test and adjust the scanner. These tests are optional. You may use them to check the system for errors.

Table 6-19 Contents in chapter

Section	Description	Page Number
6-1	Overview	6-1
6-2	Regulatory	6-1
6-3	Power Supply Adjustment	6-1
6-4	Reloading the Probe Data	6-4
6-5	Monitor and LCD Adjustment	6-7

Section 6-2
Regulatory

Verify, where applicable, that any regulatory information or tests required by national law are present and accounted for, and any regulatory tests required by national law are performed *and* documented.

Section 6-3
Power Supply Adjustment

6-3-1 LV Unit Disassembly

This system contains three power supply modules; HV unit, LV unit, and ATX PS. However, the LV unit only can be adjusted.

6-3-1-1 Tools

- Common pillips screwdrivers
- Allen/Unbraco wrench
- Long-nose gripper

6-3-1-2 Needed Manpower

- 1 person, 15 minutes + travel

6-3-1-3 Preparations

- Shut Down the System and switch off the Main Breaker at the rear as described in section 4-2-2 on page 5.
- Remove the AC Power assy from the System

6-3-1-4 Removal Procedure

CAUTION **Do not wear the ESD wrist strap when you remove a part of power supply unit. Turn OFF power and unplug the power cord before removing a part of power supply unit. However be sure to turn off power and wear the strap before you remove a circuit boards.**

1.) Unscrew four (4) screws (1-4) to remove Left side cover of AC Power assy.

2.) Disconnect three (3) connectors from the rear side of the LV Unit. Refer to .

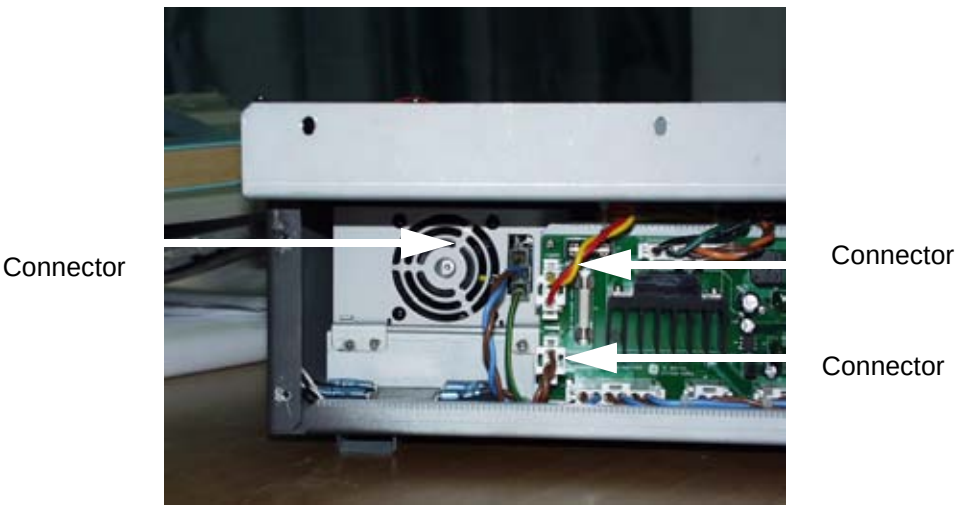


Figure 6-1 Disconnect 3 connectors

3.) Unscrew four (4) screws (8-11) to remove Right side cover of AC Power assy.

6-3-1-4 Removal Procedure (cont'd)

4.) Unscrew four 4 screws and disconnect twenty (20) connectors from the front side of the LV unit using long-nose gripper.

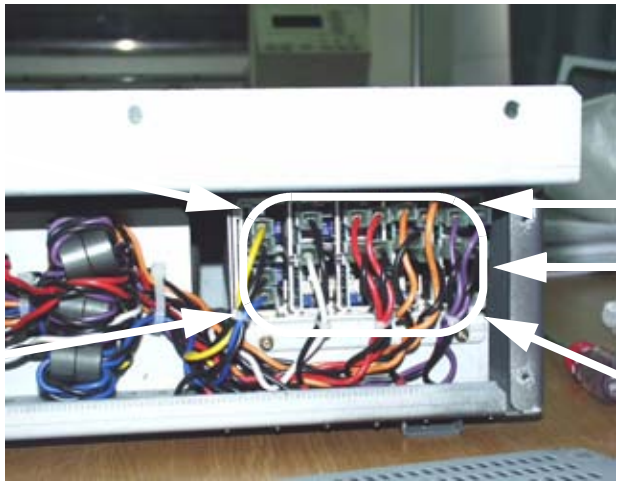


Figure 6-2 Disconnect 20 connectors

5.) Remove the LV unit.

6-3-2 Adjustments Procedures

1.) Using the following VRs, DC output can be adjusted.

Table 6-20 DC Output Specification for LV Unit

VR	Specifications
VR1	6V
VR2	3.3V
VR3	6V
VR4	-6V
VR5	-15 V
VR6	5V
VR7	15V

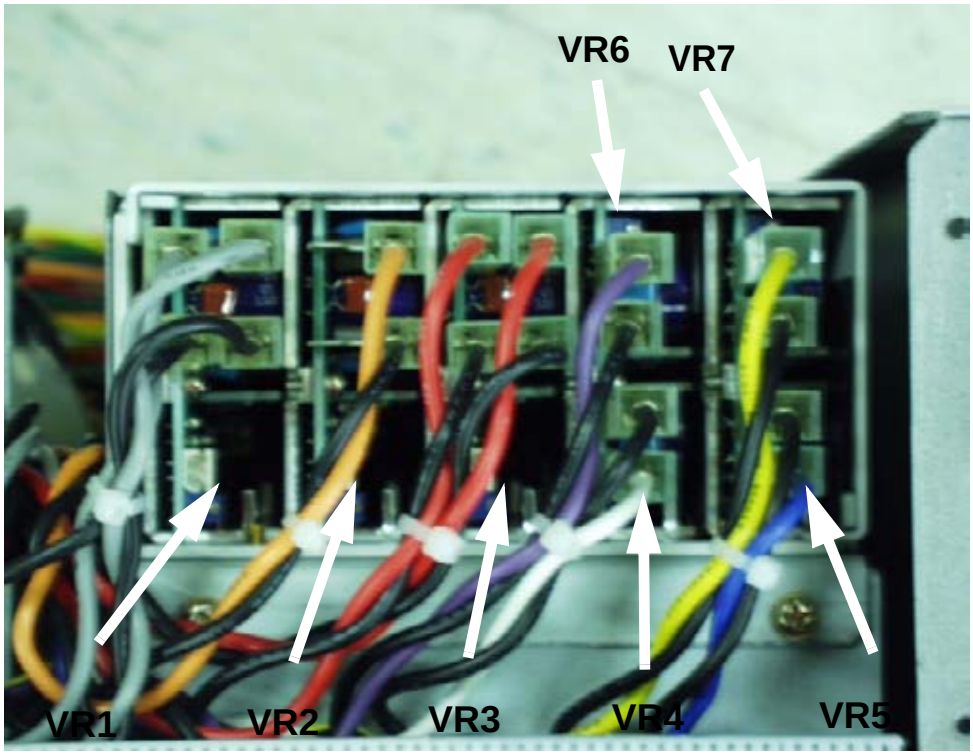


Figure 6-3 VRs for Adjusting DC Output

Section 6-4
Reloading the Probe Data

This procedure will be used for troubleshooting when a image sensitivity is NOT recovered. For details, refer to Section 7, Troubleshooting.

This rewrites the probe data (probe delay data for beam forming) saved on the flash memories of DDBF and TRAP boards.

NOTICE The Service dongle is the programmed key valid for one year.

1.) Insert the Service Dongle into the USB Connector, located at the front or rear panel of the scanner.

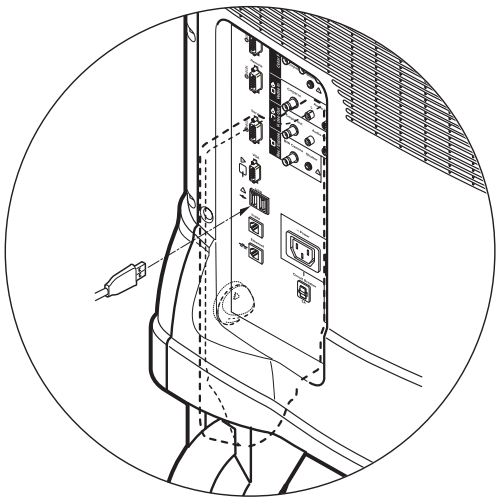


Figure 6-4 Inserting the Service Dongle

2.) Power ON the scanner.

3.) Then the Start Loader display will be shown on the monitor display.

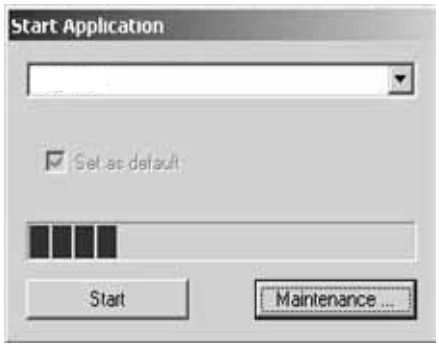


Figure 6-5 Start Application

4.) To enter the Maintenance Mode, select Maintenance button.

NOTE: Proceed the step 4 in 10 seconds, or the Start is selected automatically when it time-out.

Section 6-4 Reloading the Probe Data (cont'd)

5.) Then the Maintenance Access Menu will be shown on the monitor display. Enter the password to logon the system. The User Name is not necessary.

Figure 6-6 Password Entry Screen

6.) Then the Maintenance window will be shown on the monitor display. Select the "Exit to Windows" button.

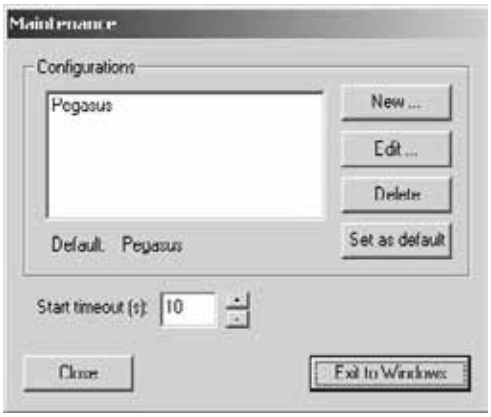


Figure 6-7 Maintenance Window

Section 6-4 Reloading the Probe Data (cont'd)

7.) Windows Desktop screen is displayed.

Figure 6-8 Windows 2000 Desktop

Section 6-5
Monitor and LCD Adjustments

6-5-1 Contrast and Brightness Adjustment

To adjust the contrast and brightness:

1.) Press the Toggle button (1) for contrast and brightness. Confirm that the contrast (or brightness) indicator is displayed on the monitor. If the brightness is displayed, press the toggle button again.

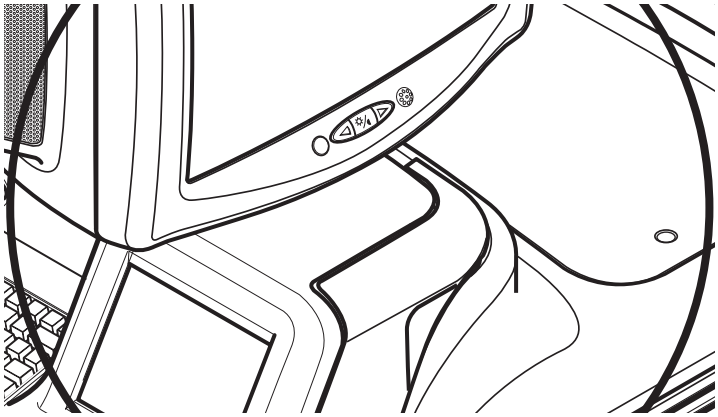


Figure 6-9 Monitor

2.) Press the Adjustment button (+, 2) to increase contrast (or brightness).

3.) Press the Adjustment button (-, 3) to decrease contrast (or brightness).
The amount of contrast (or brightness) is shown on a slide bar on the screen. Refer the following table for the setting.

Table 6-21 Contrast and Brightness Recommended Setting

Room Condition	Monitor Adjustment	
	Contrast	Brightness
Dark room	50	40
Dim room	60	35
Bright room	70	30
room for Cardiology	80	20

Record the final brightness and contrast settings and leave this information withe the system. Generally speaking, do not change the controls once they have been set, the display becomes the reference for the hard copy device(s).

NOTE: After readjusting the monitor's Contrast and Brightness, readjust all preset and peripheral settings.

6-5-2 LCD Adjustment

6-5-2-1 Tools

- Common pillips screwdrivers
- Allen/Unbraco wrench
- Long-nose gripper

6-5-2-2 Needed Manpower

- 1 person, 15 minutes + travel

6-5-2-3 Preparations

- Shut Down the System and switch off the Main Breaker at the rear as described in section 4-3-2 on page 3.
- Remove the Keyboard Assy from the System. For more information, refer to the Chapter 8, Replacement Procedure.

6-5-2-4 Removal Procedure

CAUTION **Do not wear the ESD wrist strap when you remove a part of power supply unit. Turn OFF power and unplug the power cord before removing a part of power supply unit. However be sure to turn off power and wear the strap before you remove a circuit boards.**

1.) Remove the OP side R Cover to access. Refer to section 8-5-9 on page 54.
2.) Access to the OSD Menu display button located at backside of the LCD.

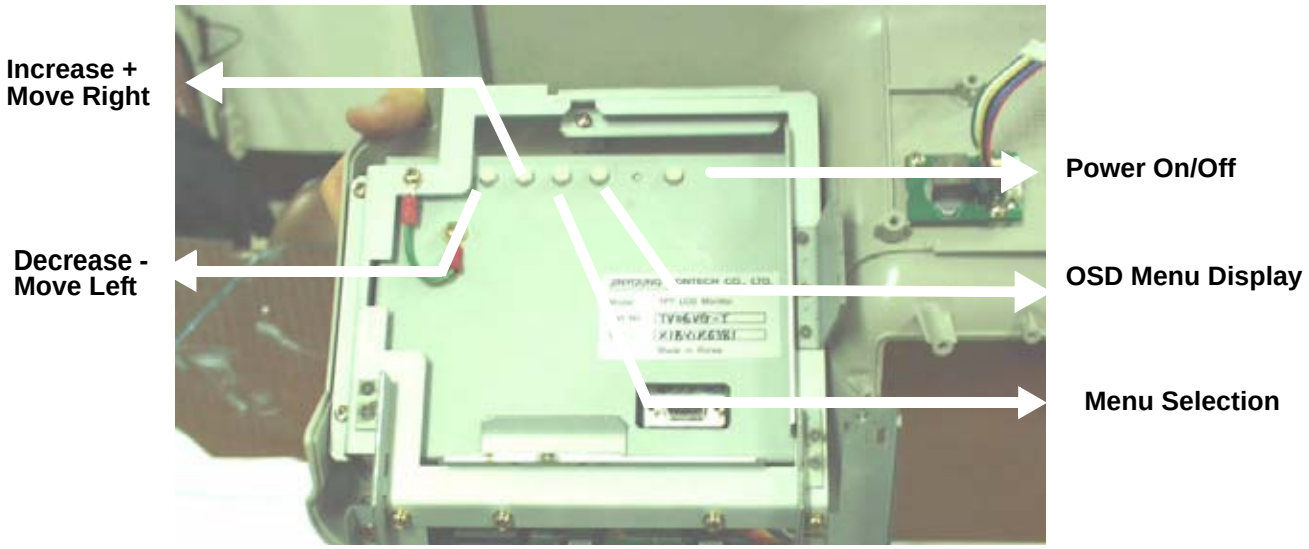


Figure 6-10 OSD Control

6-5-2-4 Removal Procedure (cont'd)

3.) OSD Menu is shown on the LCD screen. Refer to Figure 6-11 on page 6-10 .

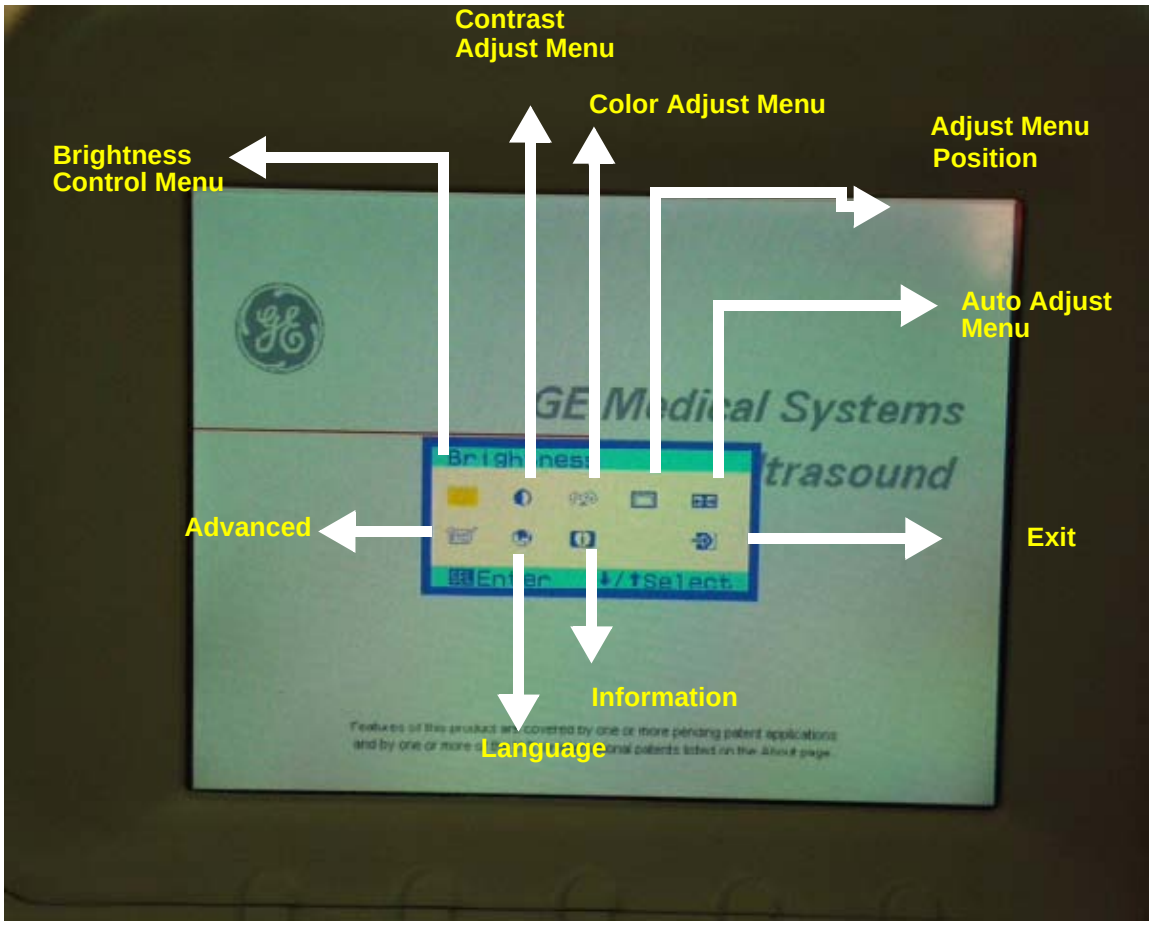


Figure 6-11 OSD Menu Display

4.) Move the Cursor using Move Right or Left button to adjust the Brightness of the LCD.

5.) Press the Menu Selection button with the yellow cursor on Brightness icon.

6-5-2-4 Removal Procedure (cont'd)

6.) Use Increase or Decrease button to adjust the Brightness. Refer to Figure 6-12 on page 6-11 .

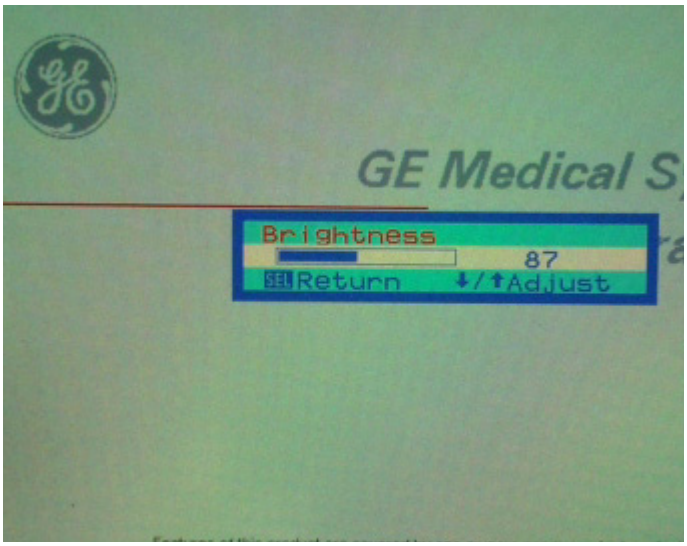


Figure 6-12 Brightness Adjustment

7.) Move the cursor to execute Auto Adjust.

8.) Make sure that the Auto Adjust is selected, then the Menu Selection Button.

9.) LCD display Auto Adjustment procedures will be started automatically.

10.) After finishing the Auto Adjustment procedures, the following menu is displayed on the LCD.

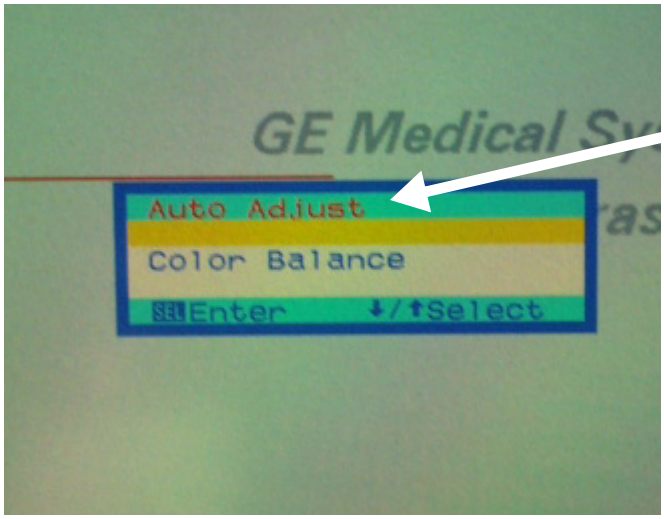


Figure 6-13 Auto Adjustment

11.) Make sure that the LCD displacement is fixed and shown at the center location.

12.) If it is fixed appropriately, go on to the next step.
If the display is not adjusted yet, go back and repeat the adjustment procedures form step 7.

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Chapter 7
Diagnostics/Troubleshooting

Section 7-1
Overview

7-1-1 Purpose of Chapter 7

This section describes how to setup and run the tools and software that help maintain image quality and system operation. Basic host, system, and board level diagnostics are run whenever power is applied. Some Service Tools may be run at the application level.

Table 7-1 Contents in Chapter 7

Section	Description	Page Number
7-1	Overview	7-1
7-2	Network Connectivity Trouble Shooting	7-1
7-3	Gathering Trouble Data	7-2
7-4	Screen Captures	7-4
7-5	Diagnostics	7-8
7-6	Common Diagnostics	7-15

Section 7-2
Network Connectivity Troubleshooting

There is a troubleshooting tool available that the customer can use as a first step to investigate network connectivity issues. It gives the current status of network and provides the option to restart the network components in the Back End Processor.

Activate the tool by pressing ALT+N and follow the choices displayed.

Section 7-3
Gathering Trouble Data

7-3-1 Overview

There may be a time when it would be advantageous to capture trouble images and system data (logs) for acquisition through remote diagnostics (InSite) or to be sent back to the manufacturer for analysis. There are different options to acquire this data that would give different results.

7-3-2 Collect Vital System Information

The following information is necessary in order to properly analyze data or images being reported as a malfunction or being returned to the manufacturer:

- Product Name = LOGIQ™ 5

From the *Utility>System>About* screen:

Applications Software

- Software Version
- Software Part Number

System Image Software

- Image Revision
- Image Part Number

7-3-3 Collect a Trouble Image with Logs

If the system should malfunction, press the Alt-D keys simultaneously. This will collect a screen capture of the image monitor, system presets and the following logs:

- Keyboard Shadow Log
- Error Logs
- Crash Log
- Power Supply
- Temperature

NOTE: Power Supply and Temperature logs are not currently being updated by the LOGIQ™ 5.

This Alt-D function is available at all times.

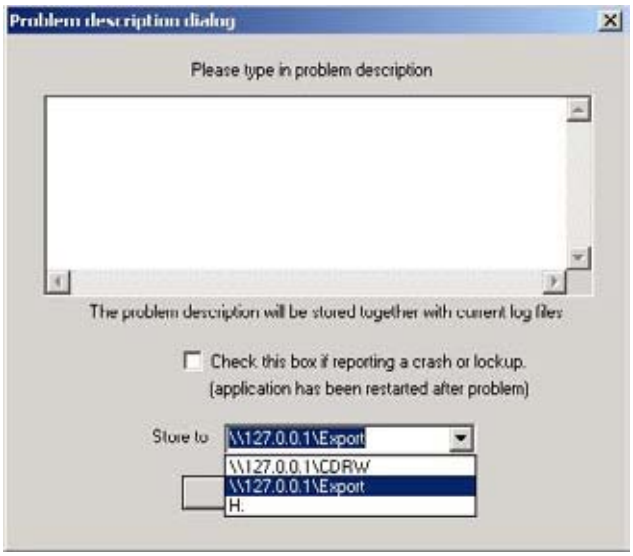
Problem description dialog
Please type in problem description
The problem description will be stored together with current log files
Check this box if reporting a crash or lockup.
(application has been restarted after problem)
Store to
\\127.0.0.1\Export
\\127.0.0.1\CDRW
\\127.0.0.1\Export
H:

Figure 7-1 ALT-D Dialog Box

When Alt-D is pressed, a menu box appears that allows for:

- A place to enter a description of the problem
- A choice to store to a pre-formatted MOD (H: drive), CD-RW or to the *Export* directory D: drive (for remote viewing through InSite).

*NOTE: You **MUST** select H: or CD-RW as the destination device if it is to be different than the default Export directory on the hard drive. Choose the H: drive which is the MOD or the CD-RW.*

The subsequent file is compressed and time stamped. The screen capture is a bitmap which eliminates the possibility of artifacts from compression.

Section 7-4
Screen Captures

There may be times when the customer or field engineer will want to capture a presentation on the screen so it may be recovered by the OnLine Center through InSite. This is accomplished by first saving the image(s) to the clipboard using a Print Key.

The P4 key is the factory default print key to accomplish a secondary screen capture. However, the default is for the video area only or the customer may have customized the P4 Key function. Therefore, screen capture should involve the following steps:

1.) Check and record any custom settings for the Print4 button.
2.) Set the Print4 button to Whole Screen, Secondary Capture.
3.) Capture the required screens to the Hard Drive, MOD or CD-R.
4.) Restore the Print4 button to it's original settings.

7-4-1 Check and Record the P4 Key Function

Check the function of the Print 4 Key in the event that the customer may have made some custom settings.

1.) Select *Utility* from the Touch Panel.
2.) Select *Connectivity* from the Utilities Menu.
3.) Select the *Buttons* tab on the Connectivity screen.
4.) In the *Button* field, select Print4.

The Connectivity/Buttons Screen will be displayed like the one shown in Figure 7-2 on page 7-4 .

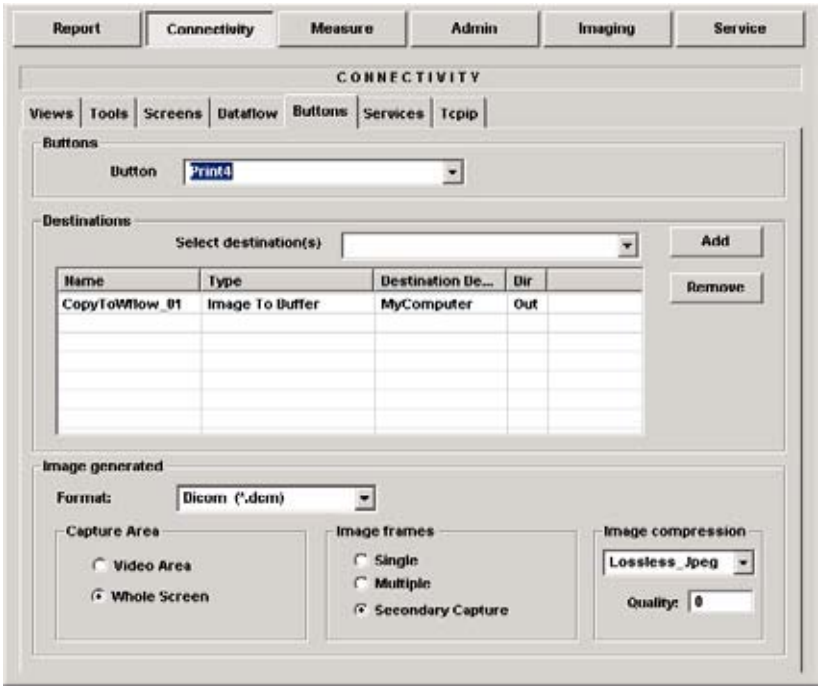

Figure 7-2 Buttons Set Up Screen

P4 is the factory default Screen Capture Key. If it is not set to Whole Screen or Screen Capture, as shown in Figure 7-2, proceed to step 5 to record the customer's custom settings.

7-4-1 Check and Record the P4 Key Function (cont'd)

5.) In the *Destinations* section, record the service that is displayed. The destinations list displays the following information:

* Name: user defined during service configuration
* Type: the type of service
* Server: the device for which the service was configured
* Dir: direction: output, input, or both (I+O)

6.) In the *Image generated* section, record the parameters related to the service.

7-4-2 Setting the P4 Key to Screen Capture

If the P4 Key is not set to screen capture:

1.) While on the Connectivity screen, with the Buttons tab displayed, go to the drop down selection menu in the *Destinations* section.

2.) From the drop down menu select *CopyToWflow_01>Image to Buffer>MyComputer>Out*.

3.) Ensure that the *Image generated* section for capture Area is set to Whole Screen, secondary Capture and No Image Compression.

4.) The P4 Key should now be set up for whole screen capture, sending the screens to the image buffer (clipboard).

7-4-3 Capturing a Screen

The following is a generic process to capture any screen from the scanner:

1.) Navigate to and display the image/screen to be captured.

2.) Press **P4**. This will place a snapshot of the screen on the "clipboard" displayed at the bottom of the scan image display.

Figure 7-3 Select Image to Capture

3.) Select SCAN from the touch panel to view the image screen and the snapshots displayed on the bottom.

4.) Highlight the snapshot to be stored to the system hard drive, MOD or CD-R.

5.) Select Menu on the right side of the image screen, then highlight and select SAVE AS.

Figure 7-4 Menu > Save As

7-4-3 Capturing a Screen (cont'd)

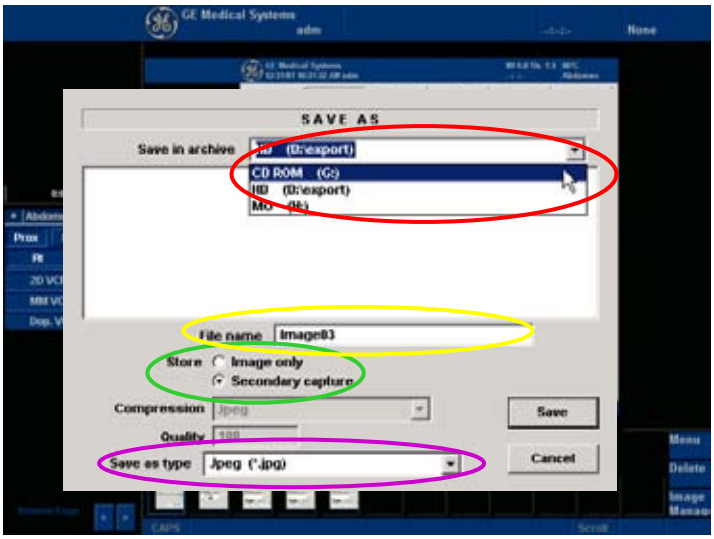

Figure 7-5 Save Dialog Box

6.) A Save dialog box will be opened. Choose *d:\export folder* as the archive location to save the image on the hard disk, MOD or CD-R.

7-4-4 Reset the P4 Key to Customer's Functionality

If the customer had programmed the P4 Key to a function other than screen capture, restore that functionality recorded in section 7-4-1 on page 4. Refer to Figure 7-2.

1.) Select *Utility* from the Touch Panel.
2.) Select *Connectivity* from the Utilities Menu.
3.) Select the *Buttons* tab on the Connectivity screen.
4.) In the *Button* field, select Print4.
5.) In the *Destinations* section, select the service(s) recorded in step 5, Section 7-4-1. The destinations list displays the following information:
   * Name: user defined during service configuration
   * Type: the type of service
   * Server: the device for which the service was configured
   * Dir: direction: output, input, or both (I+O)

NOTE: Only output services can be associated to the print keys.

6.) In the *Image generated* section, select the parameters related to the service recorded in step 6, Section 7-4-1.

Section 7-5
Diagnostics

As described in - Components and Fuctions (Theory), the service platform uses a web-based user interface (UI) to provide access to common service components.

The Diagnostic home page displays a listing of test categories consisting of Common Diagnostics, and LOGIQ5 Diagnostics. Expand the desired main category to select groups or individual tests.

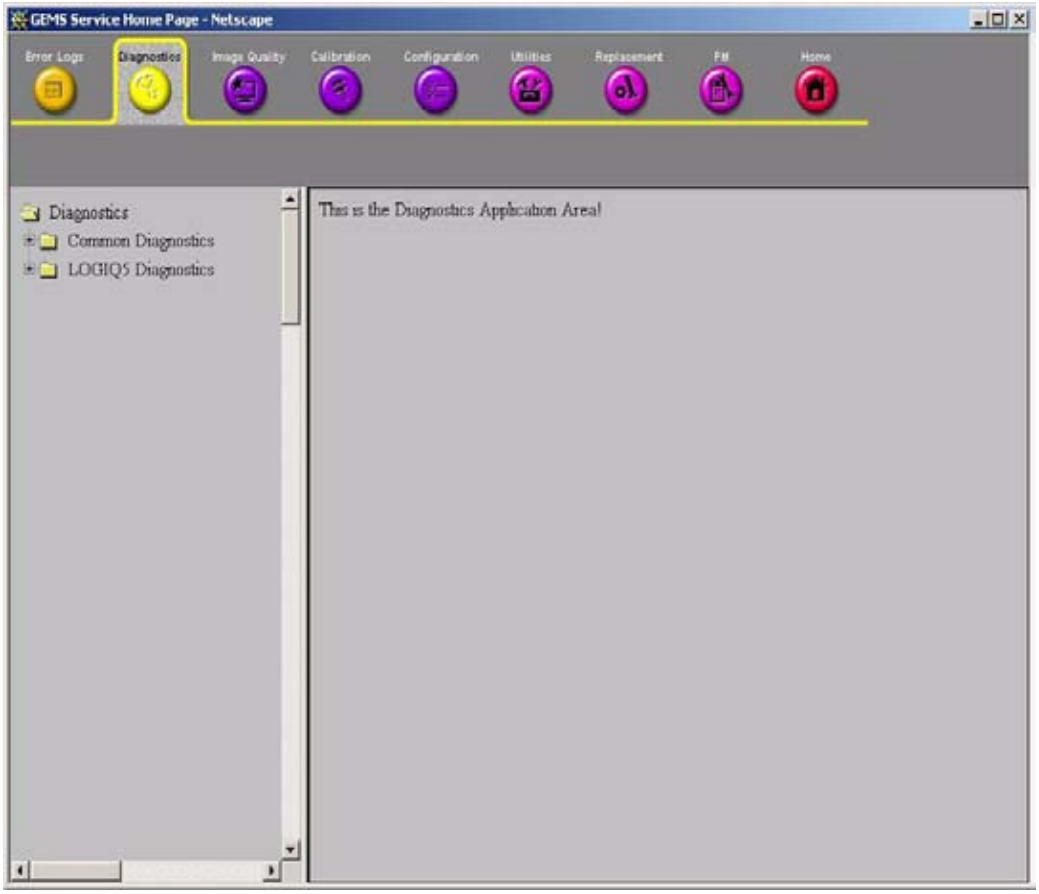

Figure 7-6 Diagnostics

Section 7-6
Common Diagnostics

Common Diagnostics is the first main heading under the GSUI heading of Diagnostics.

Figure 7-7 shows the top level menu choices under Common Diagnostics. The subheadings and their respective diagnostic/troubleshooting menu choices are called out and described in the sections below.

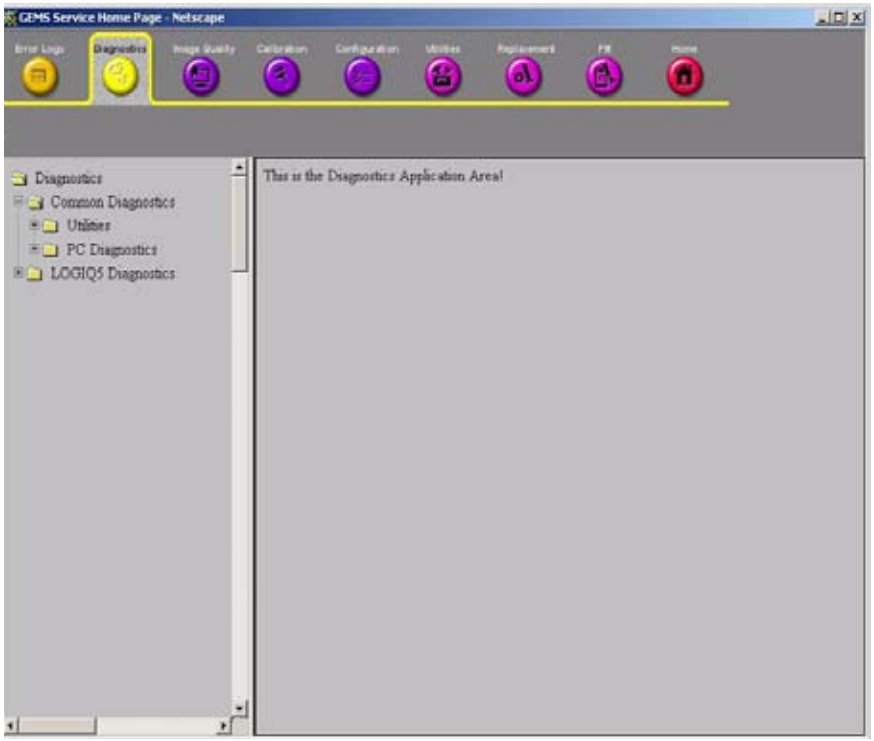

Figure 7-7 Common Diagnostics

7-6-1 Utilities

Provides two selections:

7-6-1-1 Disruptive Mode

7-6-1-2 Allows you to enable or disable disruptive mode troubleshooting. **System Shutdown**

Allows for system shutdown from the diagnostic menu. Select to *Restart System* or *Shutdown System.* Also, select to retain Disruptive Mode or Not.

After submitting to restart or shutdown a confirmation screen gives one last chance to confirm or cancel the request.

7-6-2 PC Diagnostics (Non-Interactive Tests)

7-6-2-1 CPU Tests

7-6-2-2 Hard Drive Tests

7-6-2-3 Memory Tests

7-6-2-4 CD/DVD Drive Test

7-6-2-5 Video Test

7-6-2-6 USB Test

7-6-2-7 PCI Board Configuration Test

7-6-2-8 AGP Video Card Test

7-6-2-9 Network Test

7-6-3 PC Diagnostics (Interactive Tests)

7-6-3-1 Keyboard Test

7-6-3-2 Audio Test

7-6-3-3 Monitor Test

Section 7-7LOGIQ5 Diagnostics

When you select a test to run, the display changes as shown in Figure 7-8 on page 7-13 .

1.) Instructions Frame
   - Displays either a test-specific text or the default instructions.

2.) Status Frame
   - Initially displays the last known status for a selected diagnostic. Once the diagnostic starts, the frame displays the “current” status of all test results.
   - The Status Frame also contains the user interface elements used for Diagnostic Control and Operator Feedback.

3.) Execute Button
   - This switch has two modes - each with appropriate text:
   - Execute - to start the diagnostic
   - Abort - to stop a diagnostic

4.) Loop Count
   - This is an editable text field that will only accept numeric values of 4 digits or less. When the switch is configured as an “execute” switch and pressed, the loop count field will be queried to determine the number of times to execute the diagnostic.

5.) Progress Indicator
   - Displays a graphical progress indicator for the user.

6.) Short Text Message
   - Displays brief messages about the test’s progress during execution.

7.) Status Frame Background Color
   - Initially gray, the Status Frame background color changes upon completion of a diagnostic to indicate completion status.
   - Code Status Fail = Red
   - Code Status Pass = Green
   - Code Status neither Pass nor Fail (Example: Aborted) = Gray (default color).

- Cable to RDi board in Rear Panel and Keyboard for Power switch.

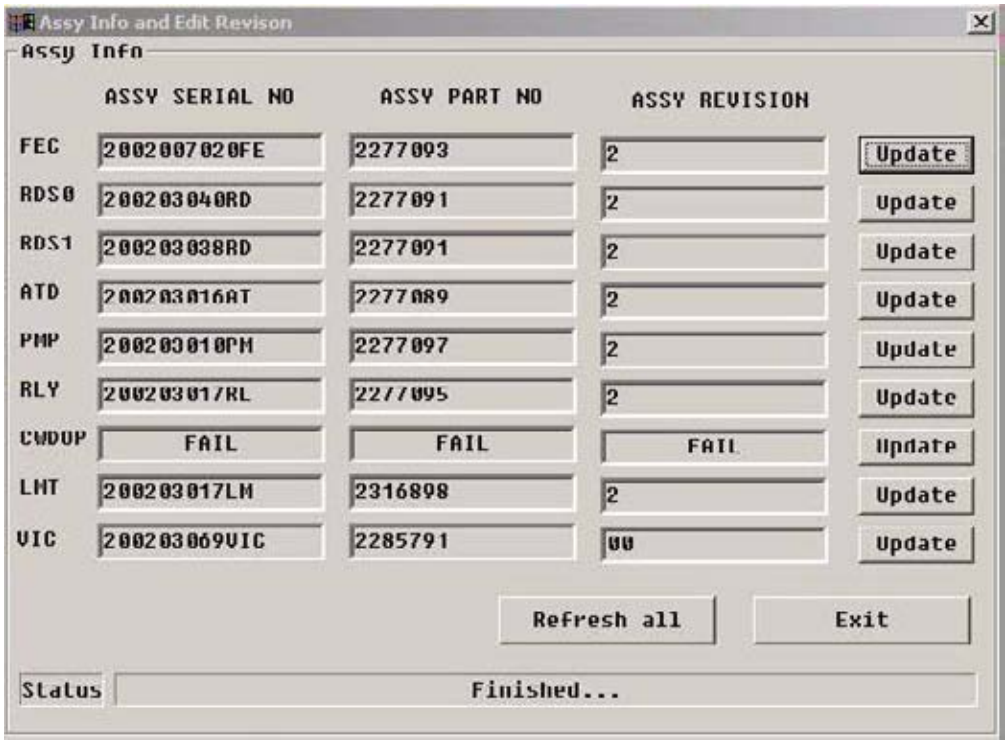

Figure 7-8 Diagnostic Group Selections - SCB Tests

- Connect J4 connector in RDi board with CON4 connector in keyboard.
- Cable to RDi assy to AC Power Assy. - Connect J6 connector in RDi board with CON1 connector in AC Power Assy.
- Cable to RDi board to BEP assy. - Connect J5 connector to CON17 connector in BEP.

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Chapter 8
Replacement Procedures

Section 8-1
Overview

8-1-1 Purpose of Chapter 8

This chapter describes replacement procedures for the following modules and subsystems.

Section	Description	Page Number
8-1	Overview	8-1
8-2	DISASSEMBLY/RE-ASSEMBLY	8-1
8-3	Monitor	8-2
8-4	Keyboard Block	8-15
8-5	Covers	8-39
8-6	Body Block	8-70
8-7	PCB Boards	8-89
8-8	PC Block	8-101
8-9	Power Block	8-153
8-10	Software Loading Procedure	8-166
8-11	Installing Base Software Load Image	8-178
8-12	Full Backup / Restore Procedure	8-202

Table 8-1 Contents in Chapter 8

Section 8-2

DISASSEMBLY/RE-ASSEMBLY

WARNING ***ONLY QUALIFIED SERVICE PERSONNEL SHOULD REMOVE ANY COVERS OR PANELS. ELECTRICAL HAZARDS EXISTS AT SEVERAL POINTS INSIDE. BECOME THOROUGHLY FAMILIAR WITH ALL HAZARDOUS VOLTAGES AND HIGH CURRENT LEVELS TO AVOID ACCIDENTAL CONTACT***

CAUTION **Do not wear the ESD wrist strap when you remove a part of power supply unit. Turn OFF power and unplug the power cord before removing a part of power supply unit. However be sure to turn off power and wear the strap before you remove a circuit boards.**

WARNING ***DO NOT SERVICE OR DISASSEMBLE PARTS UNDER FRU UNIT LEVEL AT ANY CIRCUMSTANCES.***

Section 8-3
Monitor

8-3-1 CRT Assy

Purpose: This is a description on how to remove and replace the CRT Assy.

8-3-1-1 Tools

- Common pillips screwdrivers
- Allen/Unbraco wrench

8-3-1-2 Needed Manpower

- 2 persons, 5 minutes + travel

8-3-1-3 Preparations

- Shut Down the System and switch off the Main Breaker at the rear as described in section 4-3-2 on page 3.
- Maneuver Control Console to a suitable position for removing the monitor.

8-3-1-4 Removal procedure

1.) Remove the OP Rear Cover. Refer to section 8-5-10 on page 56.

2.) Unscrew one screw cap located at (1).

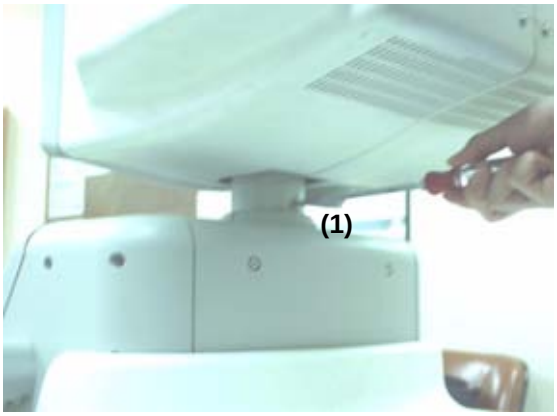


Figure 8-1 Removing OP rear Cover and Unscrew screw

8-3-1-4 Removal procedure (cont'd)

3.) Remove 3Connectors (CN1 - CN3) from the Monitor. Refer to Figure 8-2.

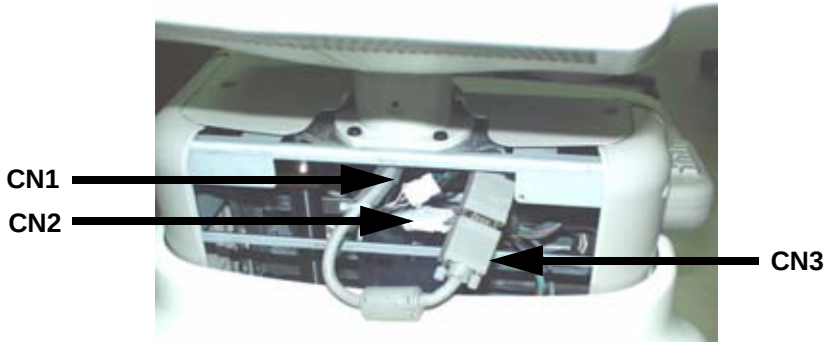


Figure 8-2 Disconnect three(3) connectors

4.) Lift the Monitor Assy upward. Refer to Figure 8-3.

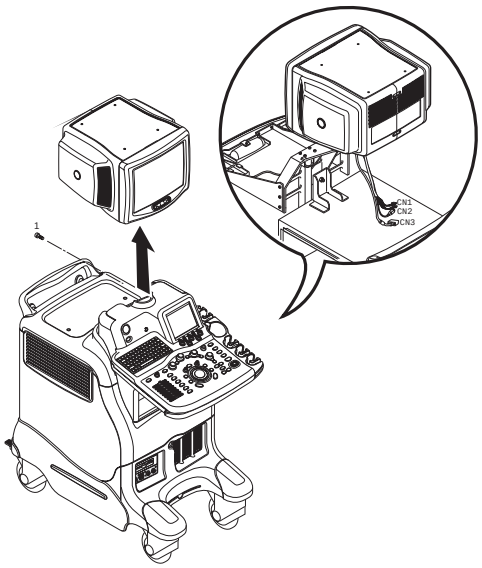


Figure 8-3 Lifting the Monitor Assy Upward

5.) Remove the Monitor Cover set. Refer to 8-3-3 "Monitor Cover Set" on page 8-7.

6.) Perform the following functional tests. If all are successful, include the debrief script provided below.

Table 8-2 Functional Tests

Service Manual Section	Functional Test / Diagnostic Test	Debrief Script
Section 4-3-1	Power On/Boot Up	"Service Manual, Direction 2300000, Rev 1+, Section 8-3-1. Equipment passed all required tests and is ready for use. "
Section 4-3-2	Power Off / Shutdown	
Section 4-6-1	CRT Assy function check procedure	
Section 10-5-2	Functional Checks (See Also Chapter 4)	

8-3-1-5 Mounting procedure

Install the new parts in the reverse order of removal.

8-3-1-6 Monitor Calibration

Purpose: This procedure describe the monitor calibation procedure for newly installed monitor or CRT assembly. The newly installed monitor should be adjusted the gain uniformity for each RGB analog singal which come from VGA port of BEP assy.

Enable test pattern for calibration :

1.) Set the display screen to reference for monitor calibration.

- Select the "utility" button on LCD -> Select the "Test Pattern" button on LCD. -> Move the trackball cursor to the "White" button on monitor screen. Then calibration reference screen would be show up on monitor screen.

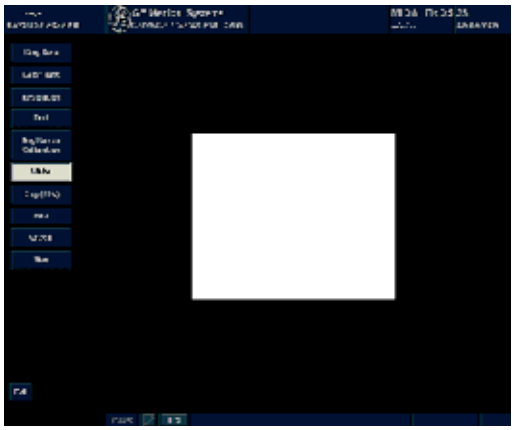


Figure 8-4 Reference Screen for Monitor Calibration

2.) Monitor OSD Menu selection

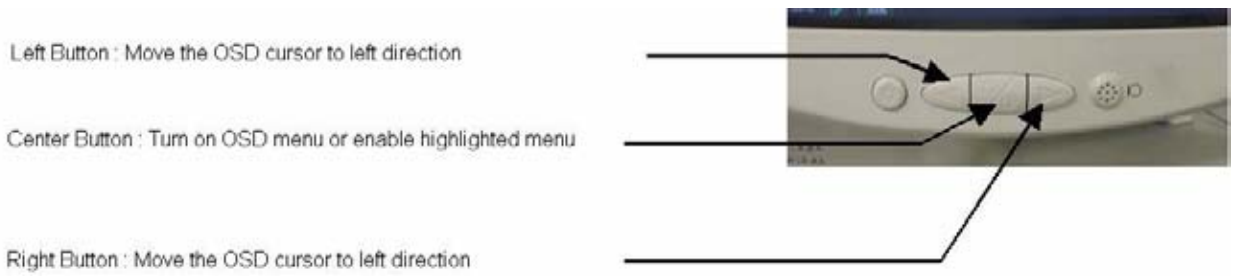

Left Button : Move the OSD cursor to left direction
Center Button : Turn on OSD menu or enable highlighted menu
Right Button : Move the OSD cursor to left direction

Figure 8-5 Monitor OSD Menu

- push the center button for more 4 seconds untilOSD menu is turned on. Push the right button 4 times to move to "RGB" icon. If the "RGB" icon become highlight, push the Center button to go into sub menu.
- Move the cursot to "calibration" menu and push center button to activate calibration. wait until monitor finish the calibration procedure. Monitor display color would be changed during Calibration.

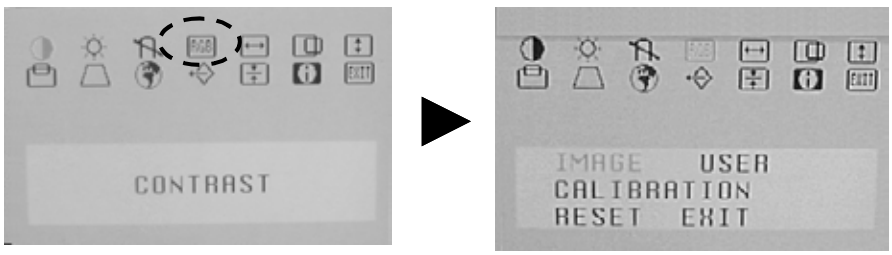


Figure 8-6 OSD Menu for calbration

8-3-2 Monitor Cable Assy

Purpose: This is a description on how to remove and replace the Monitor Assy.

8-3-2-1 Tools

- Common pillips screwdrivers
- Cutter

8-3-2-2 Needed Manpower

- 1person, 5 minutes + travel

8-3-2-3 Preparations

- Shut Down the System and switch off the Main Breaker at the rear as described in section 4-3-2 on page 3.
- Maneuver Control Console to a suitable position for removing the monitor.

8-3-2-4 Removal procedure

1.) Remove the OP Rear Cover. Refer to section 8-5-10 on page 56.

2.) Remove the Monitor Covers. For more information, refer to 8-3-3 "Monitor Cover Set" on page 8-7.

3.) Disconnect two connectors (1-2) and cut the tie wrap in the location (3). Refer to Figure 8-7.

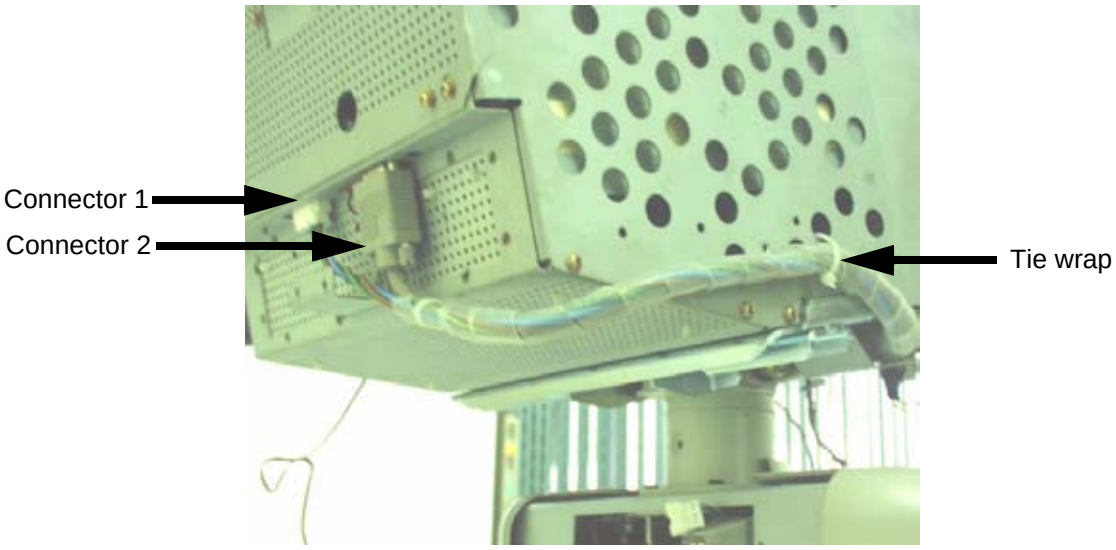


Figure 8-7 Disconnect Connectors and Cut the tiewrap

8-3-2-4 Removal procedure (cont'd)

4.) Disconnect two connectors on the other end (4-5). Refer to Figure 8-8.

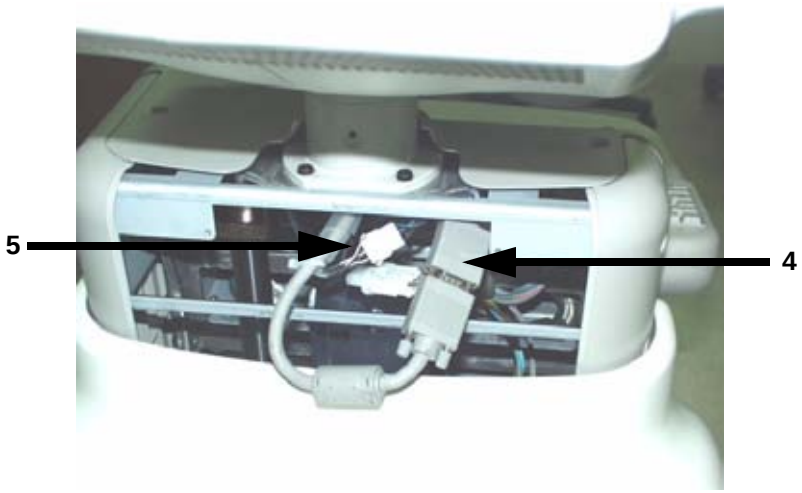


Figure 8-8 Disconnect two(2) Connectors (5-6)

5.) Pull the Cable Assy out from the OP Rear Cover.

6.) Perform the following functional tests. If all are successful, include the debrief script provided below.

Table 8-3 Functional Tests

Service Manual Section	Functional Test / Diagnostic Test	Debrief Script
Section 4-3-1	Power On/Boot Up	"Service Manual, Direction 2300000, Rev 1+, Section 8-3-2. Equipment passed all required tests and is ready for use. "
Section 4-3-2	Power Off / Shutdown	
Section 4-6-3	Monitor Cable Assy function check procedure	
Section 10-5-2	Functional Checks (See Also Chapter 4)	

8-3-2-5 Mounting procedure

Install the new parts in the reverse order of removal.

8-3-3 Monitor Cover Set

Purpose: This is a description on how to remove the Monitor Cover Set.

8-3-3-1 Tools

- Common pillips screwdrivers

8-3-3-2 Needed Manpower

- 1person, 10 minutes + travel

8-3-3-3 Preparations

- Shut Down the System and switch off the Main Breaker at the rear as described in section 4-3-2 on page 3.

8-3-3-4 Removal Procedure

1.) Remove the Tasklamp Assy, For more information, refer to section 8-3-6 on page 13.
2.) Unscrew three screws (1-2,6) to remove the Monitor Cover left.
3.) Unscrew three screws (3-5) to remove the Monitor Cover right.
4.) Unscrew four screws (7-10) to remove the Monitor Cover front.
5.) Monitor Cover Top can be removed without unscrewing.

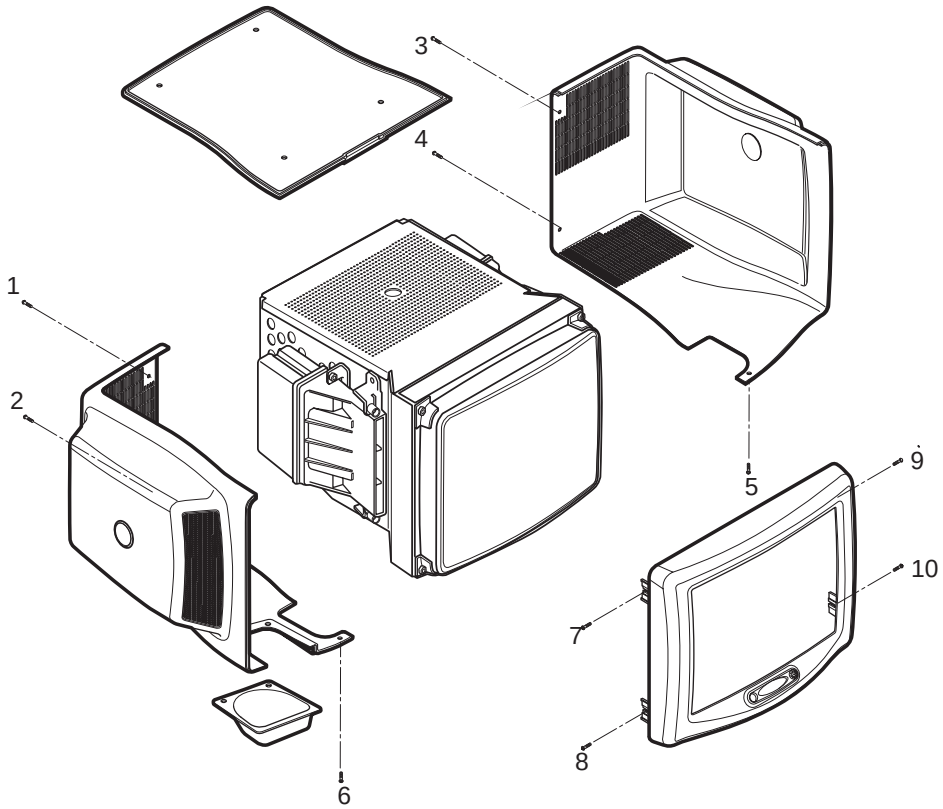


Figure 8-9 MONITOR COVER SET DISASSEMBLY

8-3-3-4 Removal Procedure (cont'd)

6.) Perform the following functional tests. If all are successful, include the debrief script provided below.

Table 8-4 Functional Tests

Service Manual Section	Functional Test / Diagnostic Test	Debrief Script
Section 4-3-1	Power On/Boot Up	"Service Manual, Direction 2300000, Rev 1+, Section 8-3-3. Equipment passed all required tests and is ready for use. "
Section 4-3-2	Power Off / Shutdown	
Section 4-8-2-9	Monitor Cover Set	
Section 10-5-5	Physical Inspection	

8-3-3-5 Mounting procedure

Install the new parts in the reverse order of removal.

8-3-4 Monitor S/W Assy

Purpose: This is a description on how to remove and replace the Monitor S/W Assy.

8-3-4-1 Tools

- Common pillips screwdrivers

8-3-4-2 Needed Manpower

- 1person, 10 minutes + travel

8-3-4-3 Preparations

- Shut Down the System and switch off the Main Breaker at the rear as described in section 4-3-2 on page 3.

8-3-4-4 Removal Procedure

1.) Remove the Monitor Cover Front. Refer to section 8-3-3 on page 7.

2.) Disconnect two connectors (1-2). Refer to Figure 8-10.

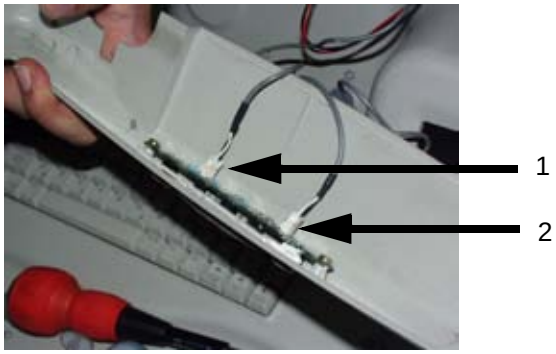


Figure 8-10 Disconnecting 2 cables

3.) Unscrew two screws (3-4) from the Monitor Cover Front. Refer to Figure 8-11.

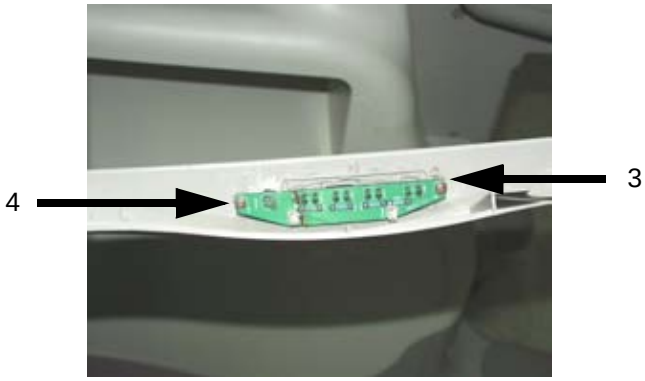


Figure 8-11 Unscrew 2 screws

8-3-4-4 Removal Procedure (cont'd)

4.) Remove the Monitor S/W Assy.Refer to Figure 8-12.

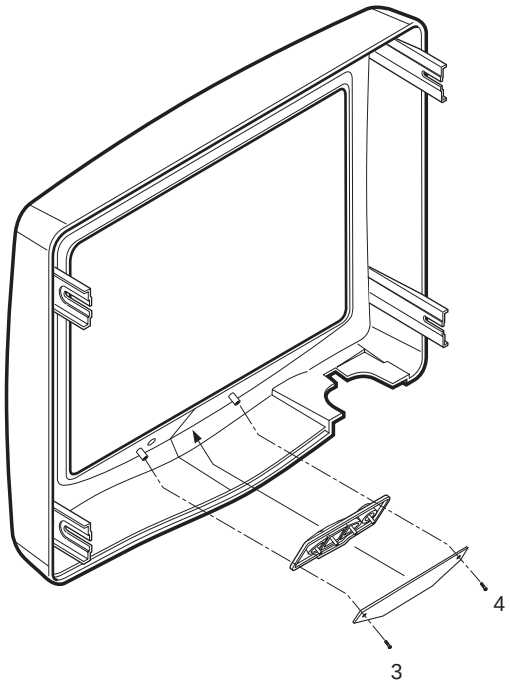


Figure 8-12 Removing Monitor S/W Assy

5.) Perform the following functional tests. If all are successful, include the debrief script provided below.

Table 8-5 Functional Tests

Service Manual Section	Functional Test / Diagnostic Test	Debrief Script
Section 4-3-1	Power On/Boot Up	"Service Manual, Direction 2300000, Rev 1+, Section 8-3-4. Equipment passed all required tests and is ready for use. "
Section 4-3-2	Power Off / Shutdown	
Section 4-6-1	CRT Assy function check procedure	
Section 10-5-5	Physical Inspection	

8-3-4-5 Mounting procedure

Install the new parts in the reverse order of removal.

8-3-5 Speaker Assy

Purpose: This is a description on how to remove and replace the Speaker Assy.

8-3-5-1 Tools

- Common pillips screwdrivers

8-3-5-2 Needed Manpower

- 1person, 10 minutes + travel

8-3-5-3 Preparations

- Shut Down the System and switch off the Main Breaker at the rear as described in section 4-3-2 on page 3.
- Monitor Cover Set should be removed before proceed. For more information Refer to section 8-3-3 on page 7.

8-3-5-4 Removal Procedure

1.) Disconnect two connectors (1-2) from the rear side of the Monitor. Refer to Figure 8-13.

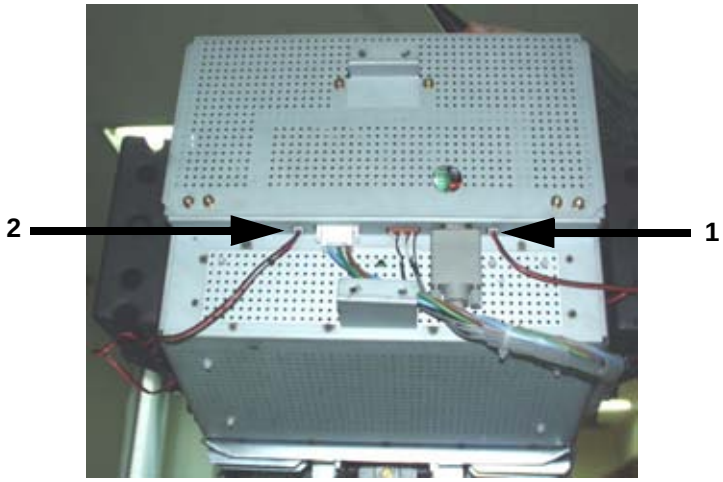


Figure 8-13 Disconnect two connectors

8-3-5-4 Removal Procedure (cont'd)

2.) Unscrew four screws (3-6) on the right side and (7-10) on the left to remove the speakers. Refer to Figure 8-14.

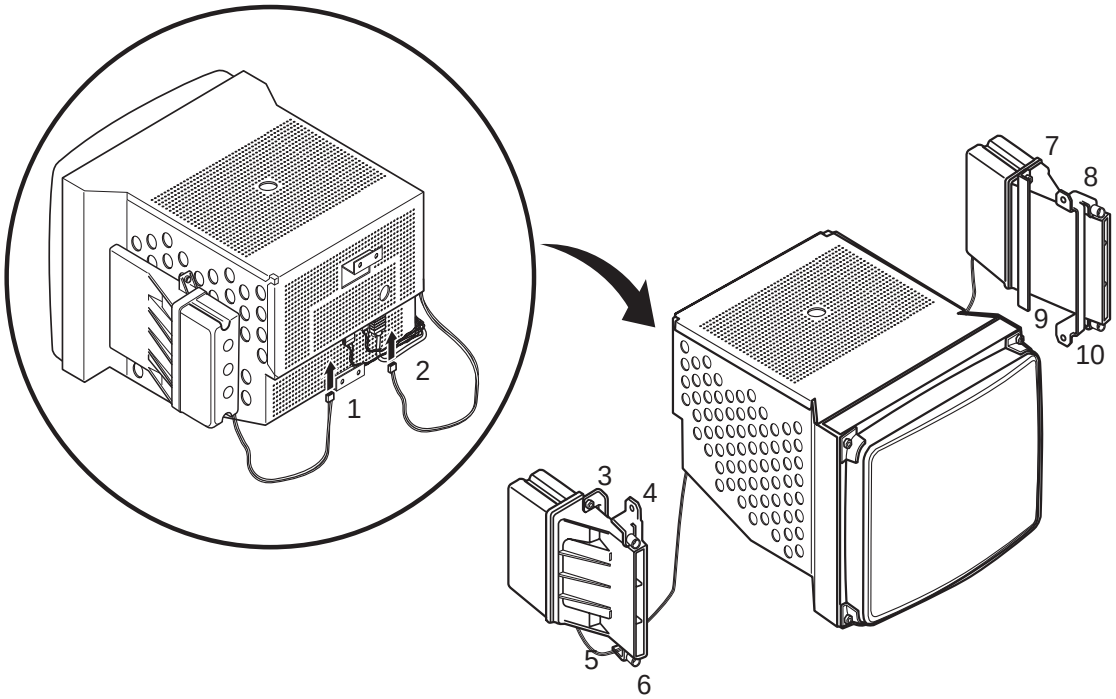


Figure 8-14 Speaker Assy Disassembly

3.) Unscrew four screws (7-10) to remove the speaker on the right.

4.) Perform the following functional tests. If all are successful, include the debrief script provided below.

Table 8-6 Functional Tests

Service Manual Section	Functional Test / Diagnostic Test	Debrief Script
Section 4-3-1	Power On/Boot Up	"Service Manual, Direction 2300000, Rev 1+, Section 8-3-5. Equipment passed all required tests and is ready for use. "
Section 4-3-2	Power Off / Shutdown	
Section 4-7-10	Speaker Assy Validation	
Section 10-5-5	Physical Inspection	

8-3-5-5 Mounting procedure

Install the new parts in the reverse order of removal.

8-3-6 Task Lamp Assy

Purpose: This is a description on how to remove and replace the Task Lamp Assy.

8-3-6-1 Tools

- Common pillips screwdrivers

8-3-6-2 Needed Manpower

- 1person, 5 minutes + travel

8-3-6-3 Preparations

- Shut Down the System and switch off the Main Breaker at the rear as described in section 4-3-2 on page 3.
- Monitor Cover Set should be removed before proceed. For more information Refer to section 8-3-3 on page 7.

8-3-6-4 Removal Procedure

1.) Unscrew two (1-2) screws to remove the TaskLamp Cover. Refer to Figure 8-15.

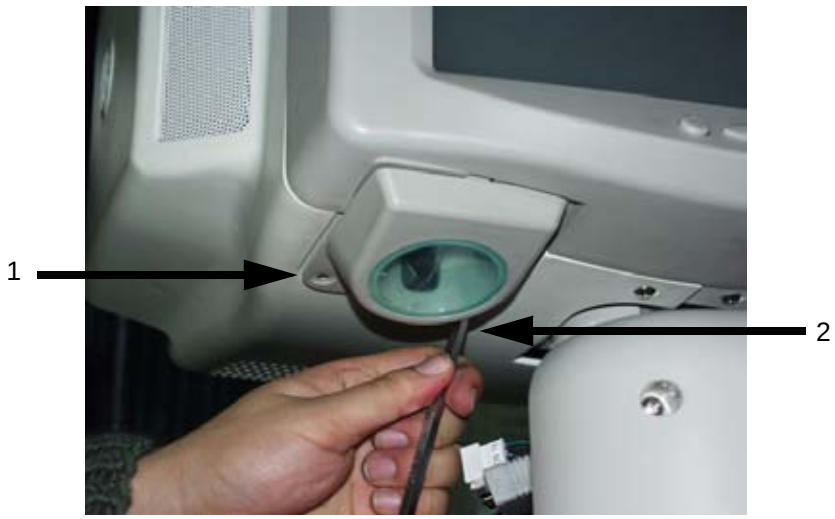


Figure 8-15 Removing Task Lamp Cover

8-3-6-4 Removal Procedure (cont'd)

2.) Disconnect two (3-4) connectors. Refer to Figure 8-16.

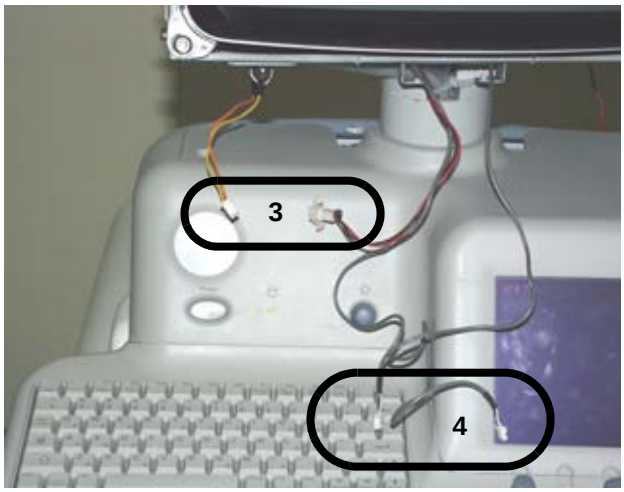


Figure 8-16 Disconnect two connectors

3.) Unscrew two (5-6) screws to remove the TaskLamp Assy. Refer to Figure 8-17.

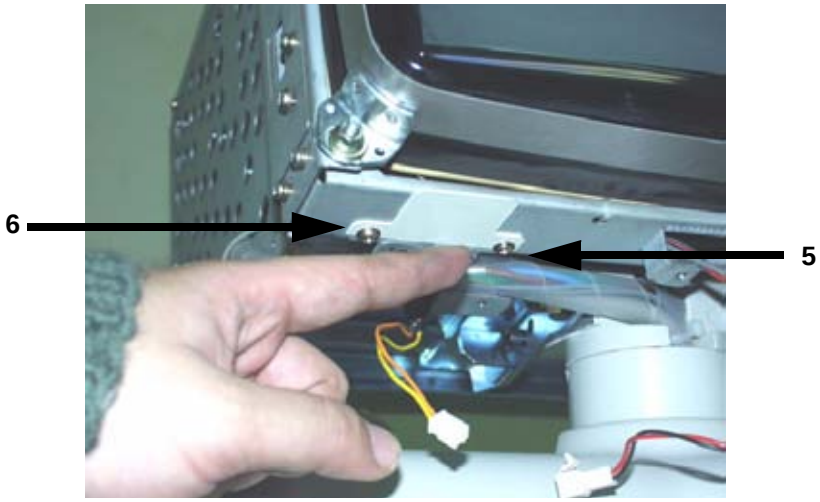


Figure 8-17 Unscrew two screws

4.) Perform the following functional tests. If all are successful, include the debrief script provided below.

Table 8-7 Functional Tests

Service Manual Section	Functional Test / Diagnostic Test	Debrief Script
Section 4-3-1	Power On/Boot Up	"Service Manual, Direction 2300000, Rev 1+, Section 8-3-6. Equipment passed all required tests and is ready for use. "
Section 4-3-2	Power Off / Shutdown	
Section 4-8-2-1	Task Lamp Assy	
Section 10-5-5	Physical Inspection	

8-3-6-5 Mounting procedure

Install the new parts in the reverse order of removal.

Section 8-4
Keyboard Block

8-4-1 KeyBoard Assy

Purpose: This is a description on how to remove and replace the Keyboard Assy.

8-4-1-1 Tools

- Common pillips screwdrivers.

8-4-1-2 Needed Manpower

- 1person, 15 minutes + travel

8-4-1-3 Preparations

- Shut Down the System and switch off the Main Breaker at the rear as described in section 4-3-2 on page 3.

8-4-1-4 Removal Procedure

1.) Remove the Probe Holder. Refer to section 8-4-3 on page 20.

2.) Unscrew two screws (1-2) from the upper side of the keyboard. Refer to Figure 8-18.

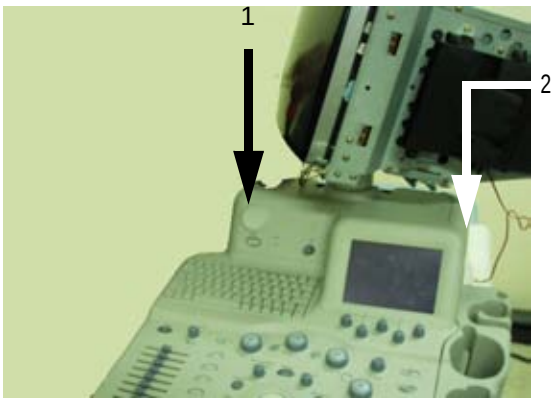


Figure 8-18 Unscrew two screws on the shoulder

3.) Unscrew three screws (3-5) from the bottom of the keyboard. Refer to Figure 8-19.

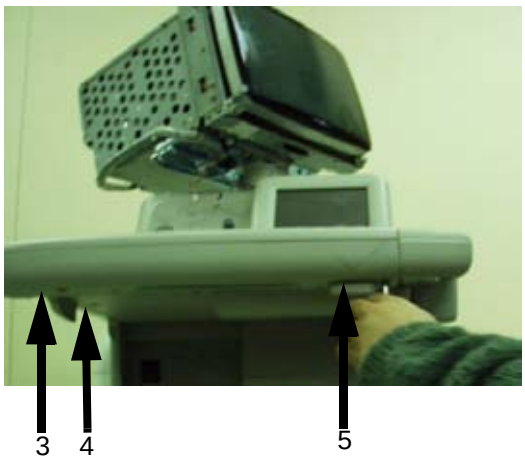


Figure 8-19 Unscrew 3 screws from the bottom

8-4-1-4 Removal Procedure (cont'd)

4.) Disconnect three connectors (6-8) from the HUB board. Refer to Figure 8-20.

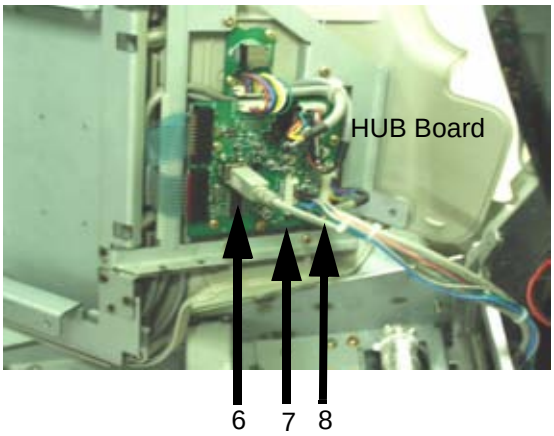


Figure 8-20 Disconnect 3 connectors from the HUB

5.) Disconnect two connectors (9-10). Refer to Figure 8-21.

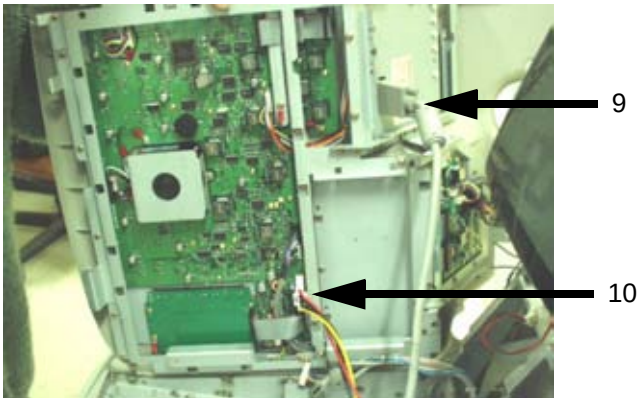


Figure 8-21 Disconnect two connectors

6.) Carefully lift the Keyboard assy from the system.

7.) Perform the following functional tests. If all are successful, include the debrief script provided below.

Table 8-8 Functional Tests

Service Manual Section	Functional Test / Diagnostic Test	Debrief Script
Section 4-3-1	Power On/Boot Up	"Service Manual, Direction 2300000, Rev 1+, Section 8-4-1. Equipment passed all required tests and is ready for use. "
Section 4-3-2	Power Off / Shutdown	
Section 4-7-1	Main Keyboard Assy validation	
Section 4-3-4	System B/M-Mode Checks	
Section 4-3-5	System CFM and PWD Checks	
Section 10-5-2	Functional Checks (See Also Chapter 4)	

8-4-1-5 Mounting Procedure

Install the new parts in the reverse order of removal.

8-4-1-6 Mounting procedure

1.) Confirm the configuration jumper setting

The new keyboard with engineering assy P/N rev ”-7” have a jumper for USB device power configuration for keyboard function keys. Before install the new keyboard , the jumper cap should be attached in proper place. The engineering assy P/N label of the keyboard is attached on the metal chassi of the keyboard assy. If the engineering assy number rev of new keybaord is less then “-7” then move to next installation step.

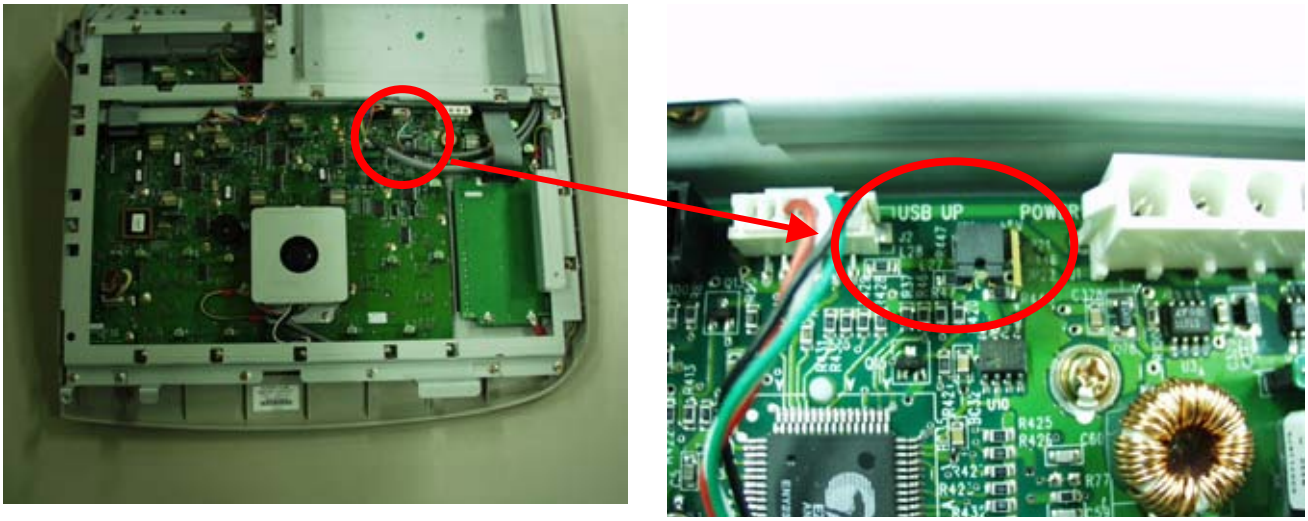


Figure 8-22 Power Configuration Jumper in Keyboard Assy

Figure 8-22 Jumper in main board of rev “-7” keybaord assy

- If the defect keyboard assy rev is same or greater then “-7” , set the jumper cap of new keyboard as same as defect keyboard.

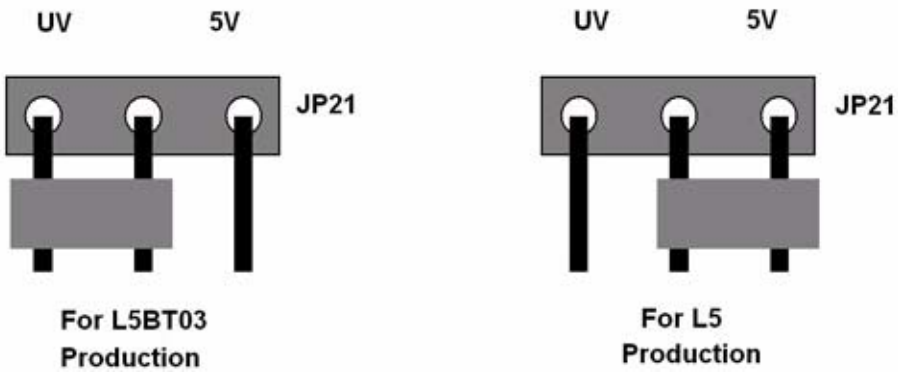


Figure 8-23 Cap Position for L5BT03 Production System and L5

Install the new parts in the reverse order of removal.

8-4-2 KeyBoard Front Grip

Purpose: This is a description on how to remove and replace the Keyboard Front Grip.

8-4-2-1 Tools

- Common pillips screwdrivers

8-4-2-2 Needed Manpower

- 1person, 25 minutes + travel

8-4-2-3 Preparations

- Shut Down the System and switch off the Main Breaker at the rear as described in section 4-3-2 on page 3.
- Remove the Keyboard Assy before proceed. For more information on Keyboard removal, refer to section 8-4-1 on page 15.

8-4-2-4 Removal Procedure

1.) Unscrew fourteen (14) screws (1-14). Refer to Figure 8-24.

2.) Remove the KeyBoard Front Grip.

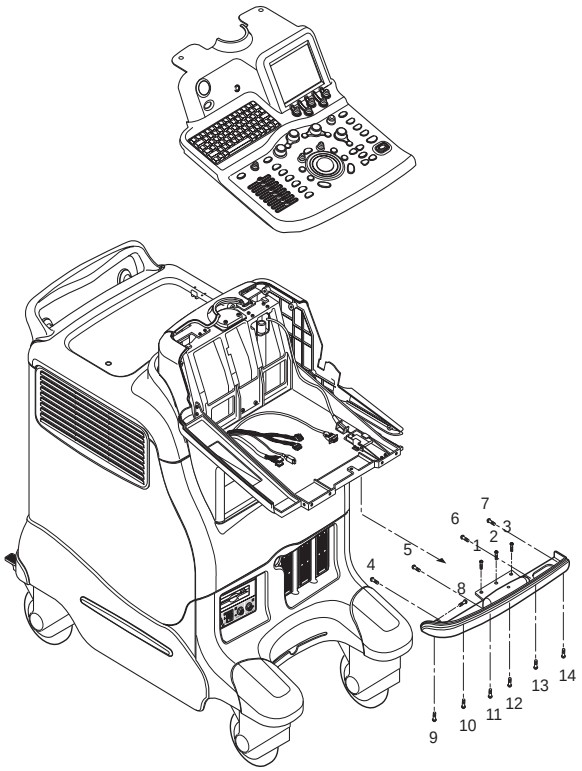


Figure 8-24 Removing Keyboard Front Grip

8-4-2-5 Mounting procedure (cont'd)

3.) Perform the following functional tests. If all are successful, include the debrief script provided below.

Table 8-9 Functional Tests

Service Manual Section	Functional Test / Diagnostic Test	Debrief Script
Section 4-3-1	Power On/Boot Up	"Service Manual, Direction 2300000, Rev 1+, Section 8-4-2. Equipment passed all required tests and is ready for use. "
Section 4-3-2	Power Off / Shutdown	
Section 4-8-2-2	Keyboard Front Grip	
Section 10-5-5	Physical Inspection	

8-4-2-5 Mounting procedure

Install the new parts in the reverse order of removal.

8-4-3 Probe Holder

Purpose: This is a description on how to remove and replace the Probe Holder.

8-4-3-1 Tools

- Not Required

8-4-3-2 Needed Manpower

- 1persons, 1 minute + travel

8-4-3-3 Preparations

none

8-4-3-4 Removal Procedure

1.) Remove PG Rivet from the Probe Holder Assy.

2.) Lift the Probe Holder from the Bracket. Refer to Figure 8-25.

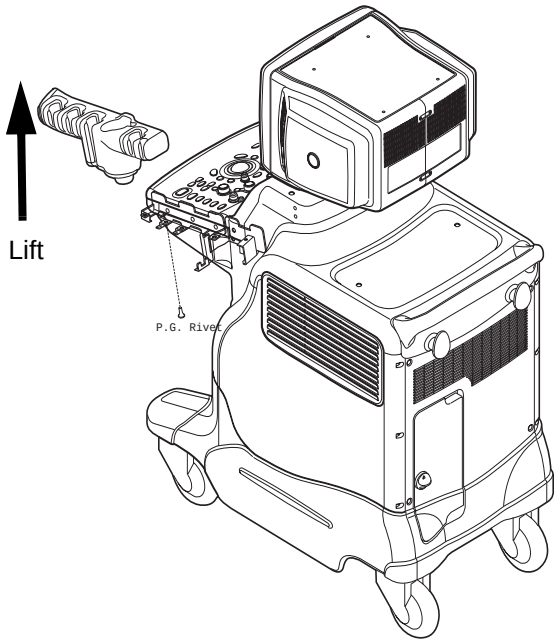


Figure 8-25 PROBE HOLDER DISASSEMBLY

3.) Perform the following functional tests. If all are successful, include the debrief script provided below.

Table 8-10 Functional Tests

Service Manual Section	Functional Test / Diagnostic Test	Debrief Script
Section 4-3-1	Power On/Boot Up	"Service Manual, Direction 2300000, Rev 1+, Section 8-4-3. Equipment passed all required tests and is ready for use. "
Section 4-3-2	Power Off / Shutdown	
Section 4-8-2-3	Probe holder	
Section 10-5-5	Physical Inspection	

8-4-3-5 Mounting procedure

Install the new parts in the reverse order of removal.

8-4-4 ECG Cable Hook

Purpose: This is a description on how to remove and replace the TGC Cable Holder.

8-4-4-1 Tools

- Common pillips screwdrivers

8-4-4-2 Needed Manpower

- 1persons, 3 minutes + travel

8-4-4-3 Preparations

- Shut Down the System and switch off the Main Breaker at the rear as described in section 4-3-2 on page 3.

8-4-4-4 Removal Procedure

1.) Turn OFF the system.

2.) Unscrew two(1-2) screws from the bottom of the keyboard. Refer to Figure 8-26.

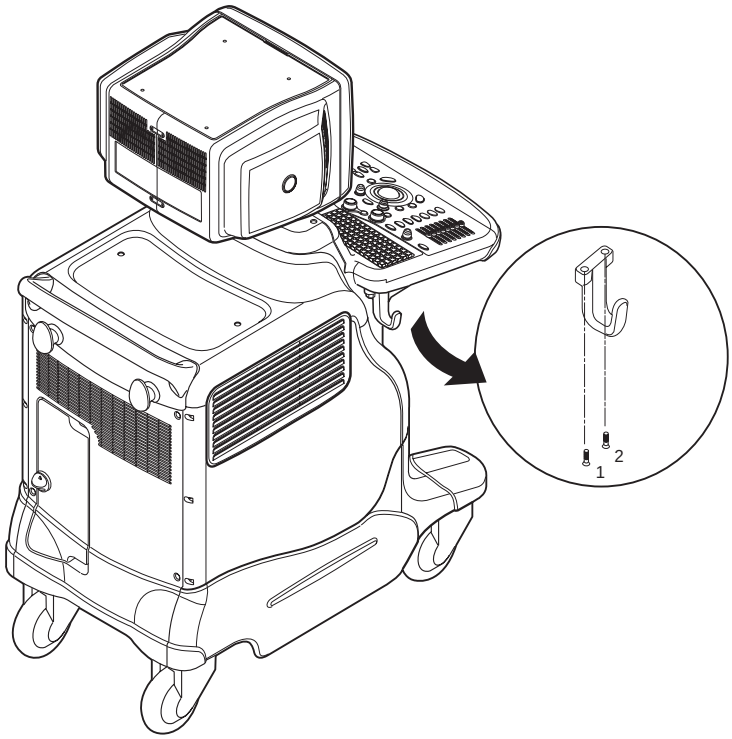


Figure 8-26 Removing ECG Cable Hook

8-4-4-4 Removal Procedure (cont'd)

3.) Perform the following functional tests. If all are successful, include the debrief script provided below.

Table 8-11 Functional Tests

Service Manual Section	Functional Test / Diagnostic Test	Debrief Script
Section 4-3-1	Power On/Boot Up	"Service Manual, Direction 2300000, Rev 1+, Section 8-4-4. Equipment passed all required tests and is ready for use. "
Section 4-3-2	Power Off / Shutdown	
Section 4-8-2	Cover Parts Function Validation	
Section 10-5-5	Physical Inspection	

8-4-4-5 Mounting procedure

Install the new parts in the reverse order of removal.

8-4-5 OP Panel Encoder Assy

Purpose: This is a description on how to remove and replace OP Panel Encoder Assy.

8-4-5-1 Tools

- Common pillips screwdrivers.
- Longnose.

8-4-5-2 Needed Manpower

- 1persons, 5 minutes + travel

8-4-5-3 Preparations

- Shut Down the System and switch off the Main Breaker at the rear as described in section 4-3-2 on page 3.
- Keyboard Assy should be removed before proceed. For more information, refer to KeyBoard Assy on section 8-4-1 on page 15.

8-4-5-4 Removal Procedure

1.) Remove the eight(8) encoder knobs (1-8) from the front side of the Keyboard. Refer to Figure 8-27.

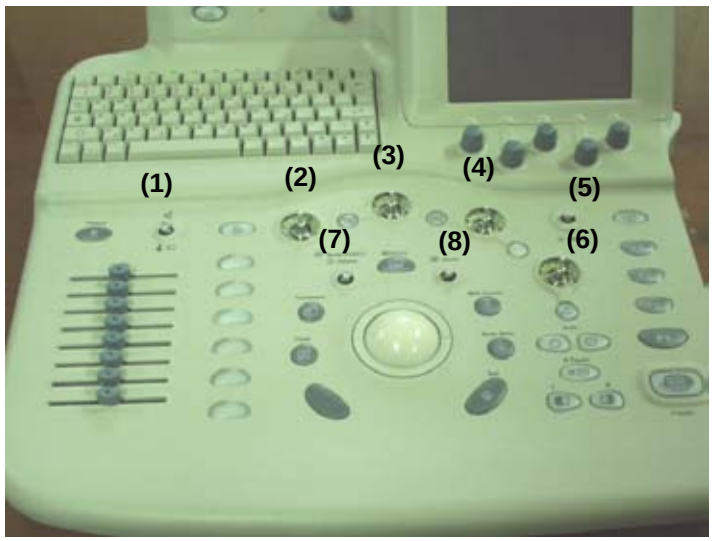


Figure 8-27 Removing 8 encoder knobs

8-4-5-4 Removal Procedure (cont'd)

2.) Using longnose, pull out encoder nuts and encoder washers from each encoder. Refer to Figure 8-28.

Figure 8-28 Pulling Out encoder nuts

3.) Turn the keyboard to back side.

4.) Disconnect each of the encoders from the back side of the keyboard. Refer to Figure 8-29.

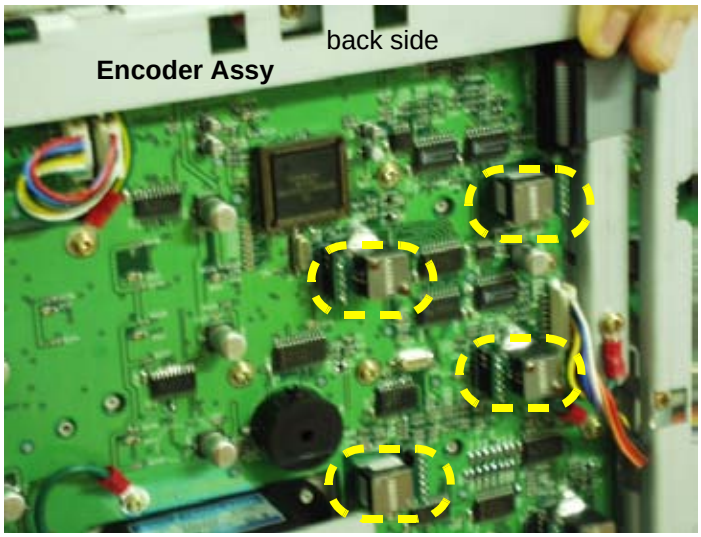


Figure 8-29 Removing Encoders

8-4-5-4 Removal Procedure (cont'd)

5.) Perform the following functional tests. If all are successful, include the debrief script provided below.

Table 8-12 Functional Tests

Service Manual Section	Functional Test / Diagnostic Test	Debrief Script
Section 4-3-1	Power On/Boot Up	"Service Manual, Direction 2300000, Rev 1+, Section 8-4-5. Equipment passed all required tests and is ready for use. "
Section 4-3-2	Power Off / Shutdown	
Section 4-7-2	OP Panel Encoder Assy Validation	

8-4-5-5 Mounting Procedure

Install the new parts in the reverse order of removal.

8-4-6 OP Panel TGC Assy

Purpose: This is a description on how to remove and replace OP Panel TGC Assy.

8-4-6-1 Tools

- Common pillips screwdrivers.

8-4-6-2 Needed Manpower

- 1persons, 5 minutes + travel

8-4-6-3 Preparations

- Shut Down the System and switch off the Main Breaker at the rear as described in section 4-3-2 on page 3.
- Keyboard Assy should be removed before proceed. For more information, refer to KeyBoard Assy on section 8-4-1 on page 15.

8-4-6-4 Removal Procedure

1.) Remove eight (8) TGC knobs from the upper side of the Keyboard. Refer to Figure 8-30.

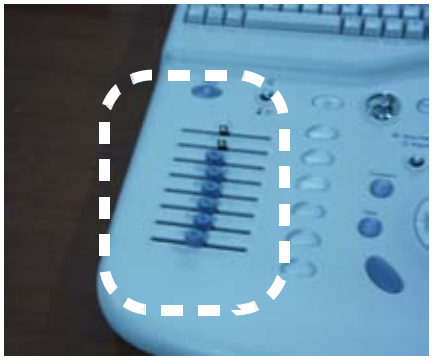


Figure 8-30 Removing TGC Knobs

2.) Disconnect the TGC connector from the back side of the keyboard.

3.) Unscrew four (4) screws and Remove the TGC Assy from the keyboard.

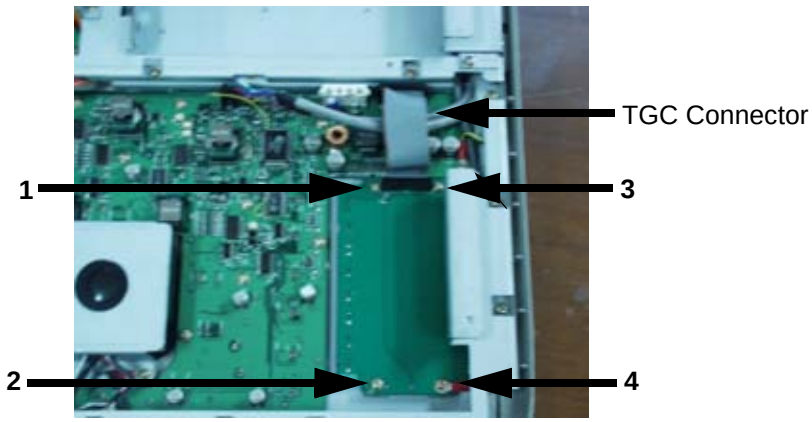


Figure 8-31 Unscrew 4 screws and remove TGC Assy

8-4-6-4 Removal Procedure (cont'd)

4.) Perform the following functional tests. If all are successful, include the debrief script provided below.

Table 8-13 Functional Tests

Service Manual Section	Functional Test / Diagnostic Test	Debrief Script
Section 4-3-1	Power On/Boot Up	"Service Manual, Direction 2300000, Rev 1+, Section 8-4-6. Equipment passed all required tests and is ready for use. "
Section 4-3-2	Power Off / Shutdown	
Section 4-7-3	OP Panel TGC Assay Validation	

8-4-6-5 Mounting Procedure

Install the new parts in the reverse order of removal.

8-4-7 TGC Knob Set

Purpose: This is a description on how to remove and replace TGC Knobs.

8-4-7-1 Tools

- Common pillips screwdrivers.

8-4-7-2 Needed Manpower

- 1persons, 5 minutes + travel

8-4-7-3 Preparations

- Shut Down the System and switch off the Main Breaker at the rear as described in section 4-3-2 on page 3.

8-4-7-4 Removal Procedure

1.) Remove eight (8) TGC knobs from the upper side of the Keyboard. Refer to Figure 8-32.

Figure 8-32 Removing TGC Knobs

2.) Perform the following functional tests. If all are successful, include the debrief script provided below.

Table 8-14 Functional Tests

Service Manual Section	Functional Test / Diagnostic Test	Debrief Script
Section 4-3-1	Power On/Boot Up	"Service Manual, Direction 2300000, Rev 1+, Section 8-4-7. Equipment passed all required tests and is ready for use. "
Section 4-3-2	Power Off / Shutdown	
Section 4-7-4	TGC Knob Set validation	

8-4-7-5 Mounting Procedure

Install the new parts in the reverse order of removal.

8-4-8 OP Panel A/N Keyboard Assy

Purpose: This is a description on how to remove and replace OP Panel A/N Keyboard Assy.

8-4-8-1 Tools

- Common pillips screwdrivers

8-4-8-2 Needed Manpower

- 1persons, 5 minutes + travel

8-4-8-3 Preparations

- Shut Down the System and switch off the Main Breaker at the rear as described in section 4-3-2 on page 3.
- Keyboard Assy should be removed before proceed. For more information, refer to KeyBoard Assy on section 8-4-1 on page 15.

8-4-8-4 Removal Procedure

1.) Unscrew five (5) screws and remove the HUB Assy EMC guard. Refer to Figure 8-33.

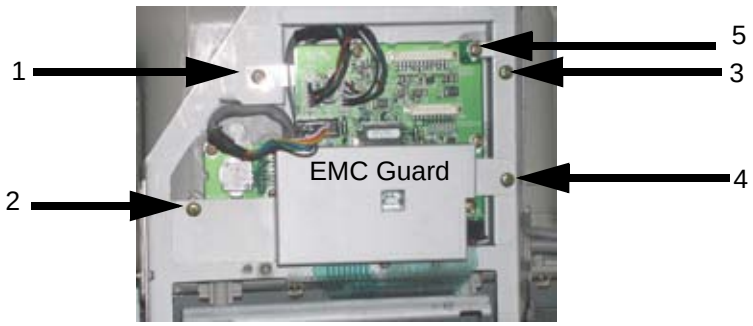


Figure 8-33 Removing HUB EMC guard

2.) Disconnect two(2) connectors (1-2) from the HUB Board. Refer to Figure 8-34.

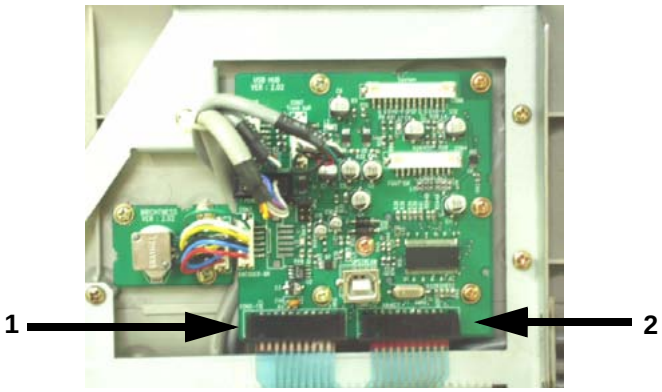


Figure 8-34 Disconnecting 2 connectors

8-4-8-4 Removal Procedure (cont'd)

3.) Unscrew eleven (11) screws (1-11) to remove the A/N keyboard prefix bracket. Refer to Figure 8-35.

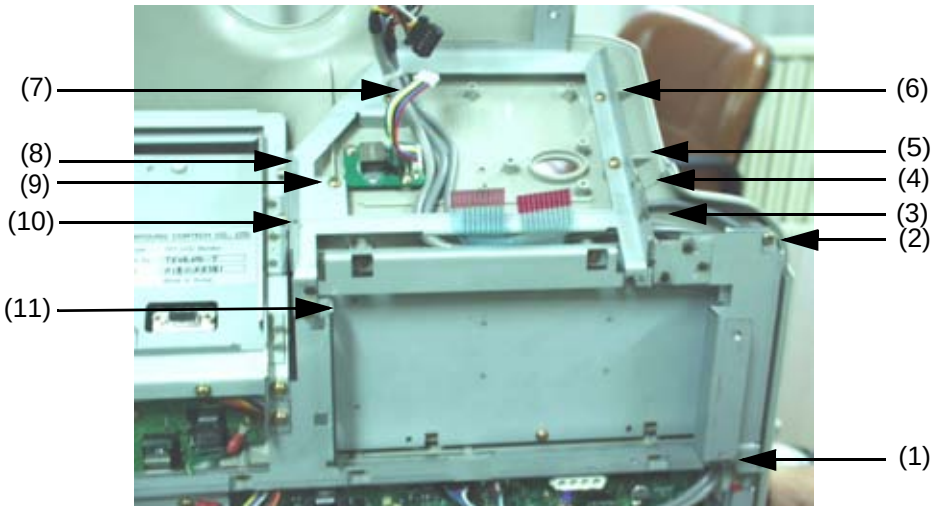


Figure 8-35 Unscrew 11 screws

4.) Remove the A/N keyboard prefix bracket

5.) Unscrew eight (8) screws (1-8) to remove the the A/N keyboard Assy. Refer to section Figure 8-36.

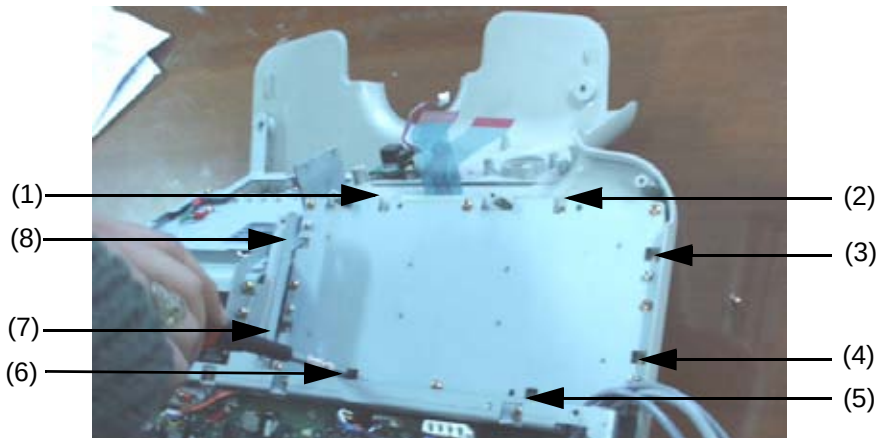


Figure 8-36 Unscrew 8 screws

6.) Lift the A/N keyboard Assy Carefully.

7.) Perform the following functional tests. If all are successful, include the debrief script provided below.

Table 8-15 Functional Tests

Service Manual Section	Functional Test / Diagnostic Test	Debrief Script
Section 4-3-1	Power On/Boot Up	"Service Manual, Direction 2300000, Rev 1+, Section 8-4-8. Equipment passed all required tests and is ready for use. "
Section 4-3-2	Power Off / Shutdown	
Section 4-7-5	A/N Key assy validation	

8-4-8-5 Mounting Procedure

Install the new parts in the reverse order of removal.

8-4-9 OP Panel Trackball Assy

Purpose: This is a description on how to remove and replace OP Panel Trackball Assy.

8-4-9-1 Tools

- Common pillips screwdrivers.

8-4-9-2 Needed Manpower

- 1person, 5 minutes + travel

8-4-9-3 Preparations

- Shut Down the System and switch off the Main Breaker at the rear as described in section 4-3-2 on page 3.
- Keyboard Assy should be removed before proceed. For more information, refer to KeyBoard Assy on section 8-4-1 on page 15.

8-4-9-4 Removal Procedure

1.) Disconnect two connectors (1-2) from the Trackball Assy. Refer to Figure 8-37.

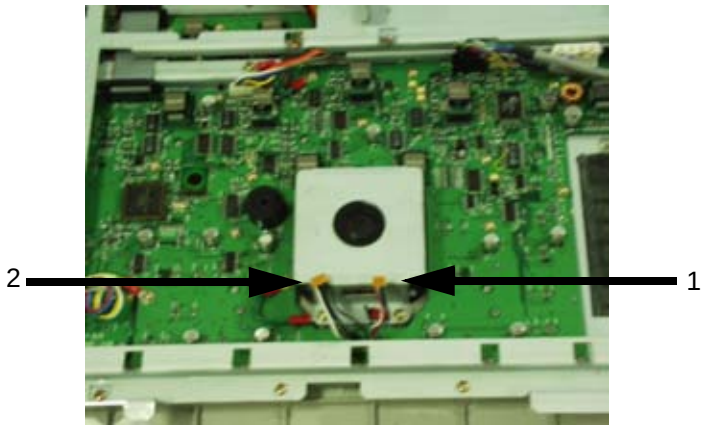


Figure 8-37 Disconnect two connectors

2.) Unscrew three screws (3-5) to remove the Trackball Assy. Refer to Figure 8-38.

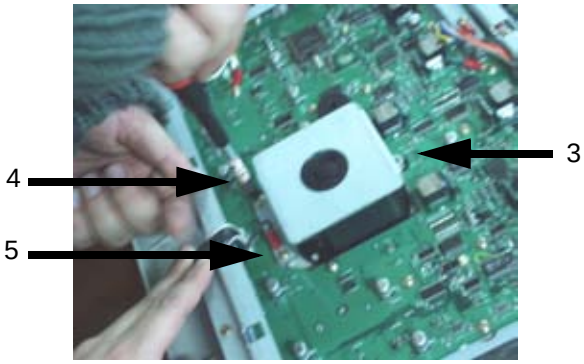


Figure 8-38 Unscrew 3 screws

8-4-9-4 Removal Procedure (cont'd)

3.) Perform the following functional tests. If all are successful, include the debrief script provided below.

Table 8-16 Functional Tests

Service Manual Section	Functional Test / Diagnostic Test	Debrief Script
Section 4-3-1	Power On/Boot Up	"Service Manual, Direction 2300000, Rev 1+, Section 8-4-9. Equipment passed all required tests and is ready for use. "
Section 4-3-2	Power Off / Shutdown	
Section 4-7-6	Trackball Assy validation	

8-4-9-5 Mounting Procedure

Install the new parts in the reverse order of removal.

8-4-10 OP Panel HUB board Assy

Purpose: This is a description on how to remove and replace HUB board Assy.

8-4-10-1 Tools

- Common pillips screwdrivers

8-4-10-2 Needed Manpower

- 1persons, 5 minutes + travel

8-4-10-3 Preparations

- Shut Down the System and switch off the Main Breaker at the rear as described in section 4-3-2 on page 3.
- Keyboard Assy should be removed before proceed. For more information, refer to KeyBoard Assy on section 8-4-1 on page 15.

8-4-10-4 Removal Procedure

1.) Unscrew five (5) screws and remove the EMC guard from the HUB Board. Refer to Figure 8-39.

Figure 8-39 Removing EMC guard

2.) Disconnect six (6) connectors (1-6) from the HUB Board Assy. Refer to Figure 8-40.

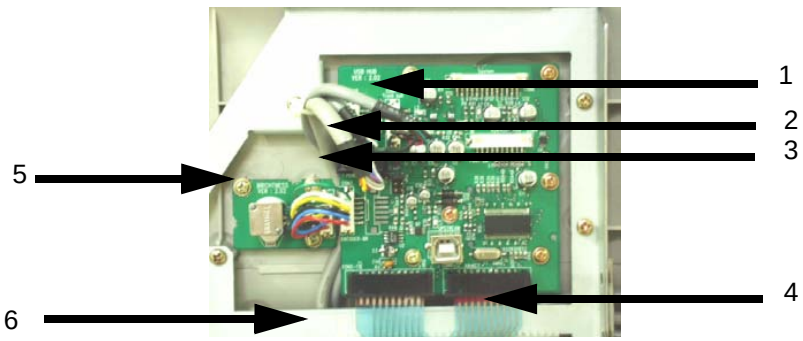


Figure 8-40 Disconnect 6 connectors

8-4-10-4 Removal Procedure (cont'd)

3.) Unscrew six (6) screws (7-12) to remove HUB Board Assy. Refer to Figure 8-41.

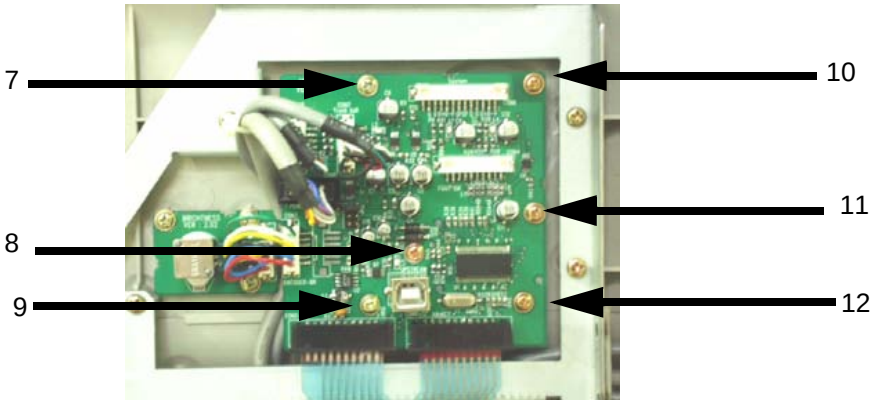


Figure 8-41 Unscrew 6 screws

4.) Perform the following functional tests. If all are successful, include the debrief script provided below.

Table 8-17 Functional Tests

Service Manual Section	Functional Test / Diagnostic Test	Debrief Script
Section 4-3-1	Power On/Boot Up	"Service Manual, Direction 2300000, Rev 1+, Section 8-4-10. Equipment passed all required tests and is ready for use. "
Section 4-3-2	Power Off / Shutdown	
Section 4-7-7	OP Panel HUB Board Assy Validation	

8-4-10-5 Mounting Procedure

Install the new parts in the reverse order of removal.

8-4-11 OP Panel LCD Assy

Purpose: This is a description on how to remove and replace LCD Assy.

8-4-11-1 Tools

- Common pillips screwdrivers

8-4-11-2 Needed Manpower

- 1person, 10 minutes + travel

8-4-11-3 Preparations

- Shut Down the System and switch off the Main Breaker at the rear as described in section 4-3-2 on page 3.
- Keyboard Assy should be removed before proceed. For more information, refer to KeyBoard Assy on section 8-4-1 on page 15.

8-4-11-4 Removal Procedure

Refer to the OP PANEL LCD ASSY DISASSEMBLY on section 8-4-11 on page 35.

1.) Unscrew ten screws (1-10) from the LCD prefix bracket to remove it. Refer to Figure 8-42.

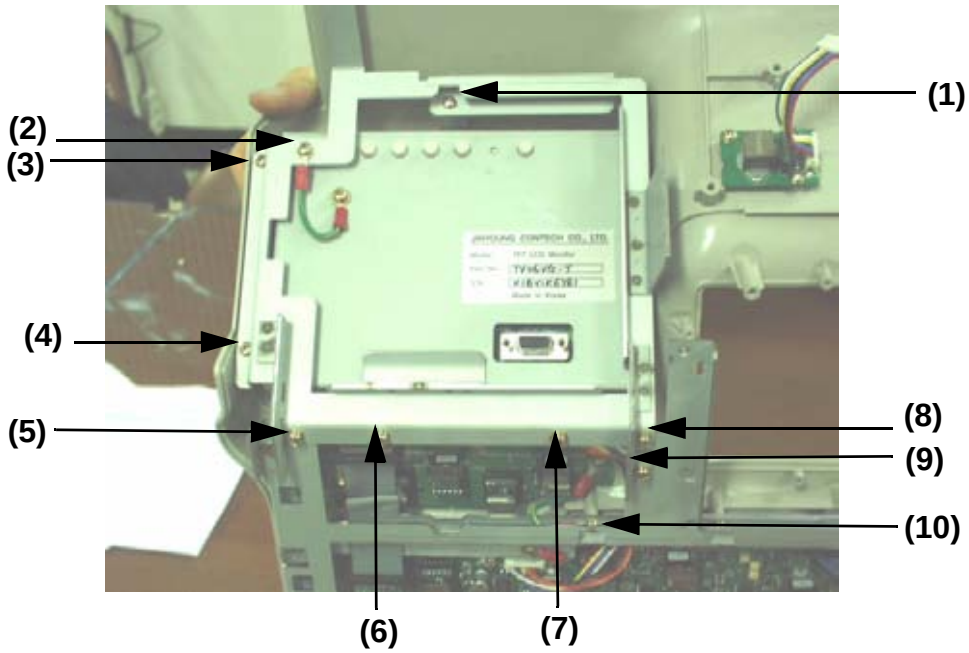


Figure 8-42 Unscrew 10 screws from the LCD brkt

8-4-11-4 Removal Procedure (cont'd)

2.) Disconnect one connector (11) from the main circuit board in the keyboard. Refer to Figure 8-43.

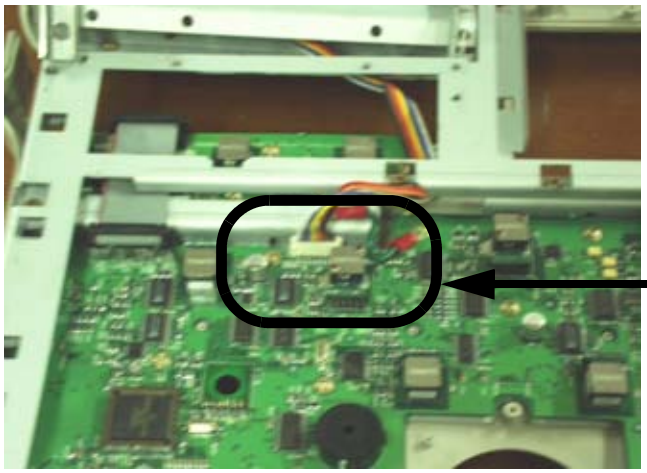


Figure 8-43 Disconnect one connector

3.) Unscrew four (4) screws (12-15) from the LCD unit. Refer to Figure 8-44.

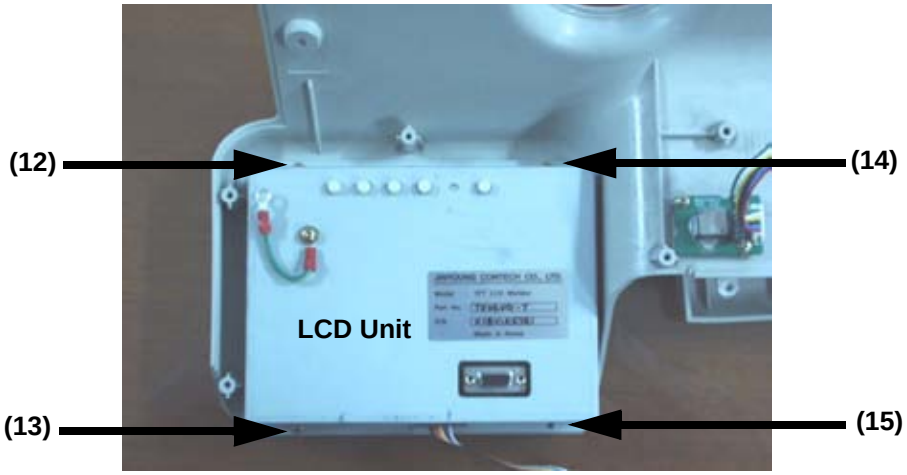


Figure 8-44 Unscrew 4 screws from the LCD unit

4.) Remove the LCD Assy from the Keyboard.

5.) Perform the following functional tests. If all are successful, include the debrief script provided below.

Table 8-18 Functional Tests

Service Manual Section	Functional Test / Diagnostic Test	Debrief Script
Section 4-3-1	Power On/Boot Up	"Service Manual, Direction 2300000, Rev 1+, Section 8-4-11. Equipment passed all required tests and is ready for use. "
Section 4-3-2	Power Off / Shutdown	
Section 4-7-8	OP Panel LCD Assy Validation	

8-4-11-5 Mounting Procedure

Install the new parts in the reverse order of removal.

8-4-12 OP Panel LCD Encoder Assy

Purpose: This is a description on how to remove and replace OP panel encoder Assy.

8-4-12-1 Tools

- Common pillips screwdrivers

8-4-12-2 Needed Manpower

- 1person, 15 minutes + travel

8-4-12-3 Preparations

- Shut Down the System and switch off the Main Breaker at the rear as described in section 4-3-2 on page 3.
- Keyboard Assy should be removed before proceed. For more information, refer to KeyBoard Assy on section 8-4-1 on page 15.

8-4-12-4 Removal Procedure

1.) Pull out five LCD encoder knobs (2-6) and one LCD Brightness Encoder from the front side of the keyboard. Refer to Figure 8-45.

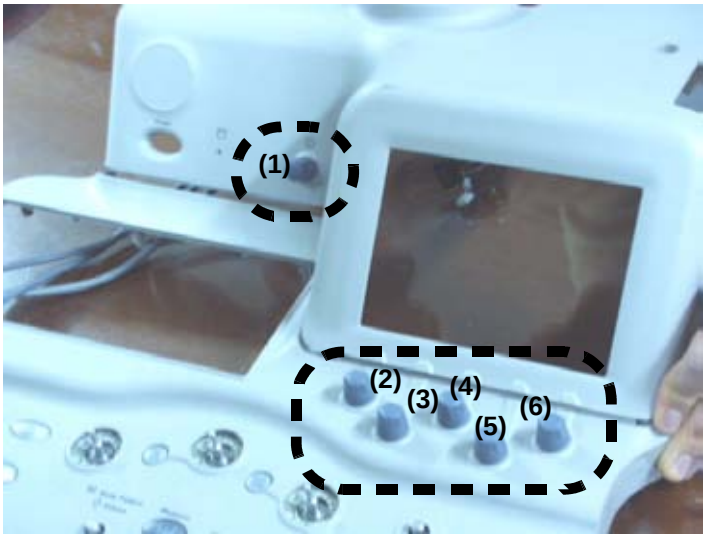


Figure 8-45 Pulling out LCD encoder knobs

2.) Turn the Keyboard Assy upside down.

8-4-12-4 Removal Procedure (cont'd)

3.) Unscrew four (4) screws (7-10) to remove the LCD encoder Assy. Refer to Figure 8-46.

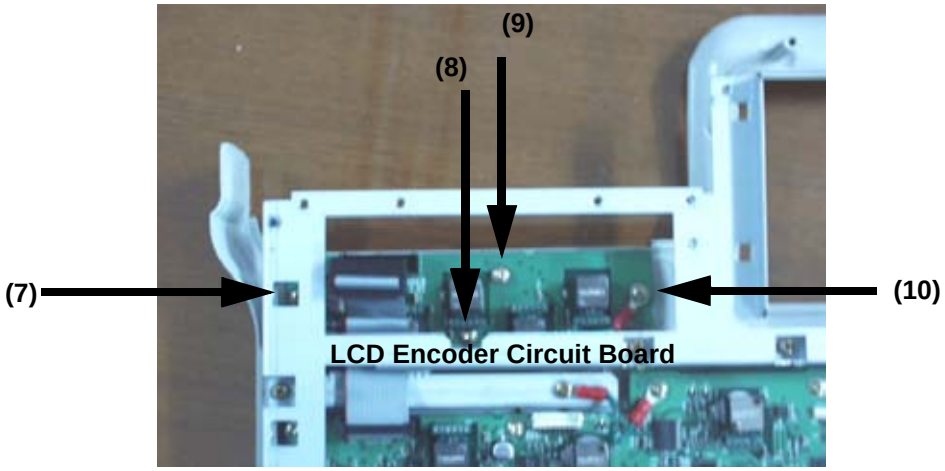


Figure 8-46 Unscrew 4 screws from LCD Encoder Circuit Board

4.) Disconnect one connector (14) from the HUB Board. and Unscrew three (3) screws (11-13) from the LCD Brightness Encoder Assy. Refer to Figure 8-47.

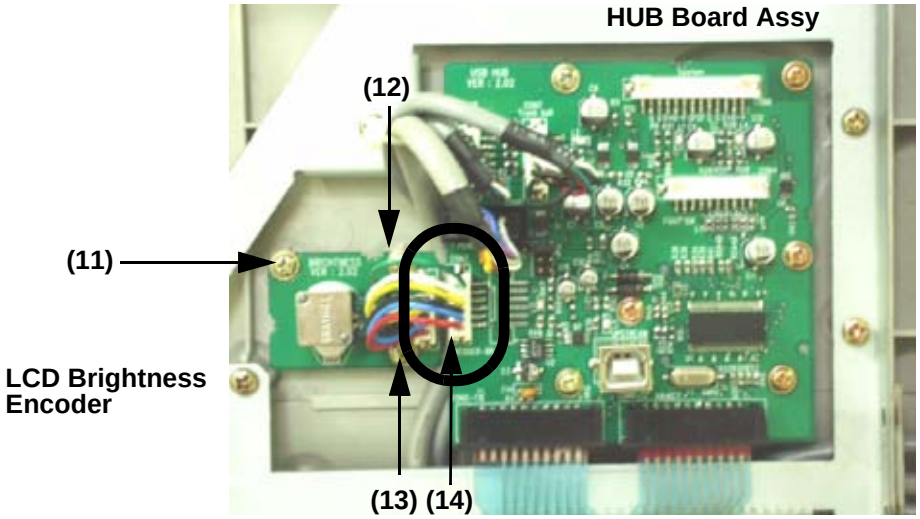


Figure 8-47 Removing LCD Encoder Assy

5.) Perform the following functional tests. If all are successful, include the debrief script provided below.

Table 8-19 Functional Tests

Service Manual Section	Functional Test / Diagnostic Test	Debrief Script
Section 4-3-1	Power On/Boot Up	"Service Manual, Direction 2300000, Rev 1+, Section 8-4-12. Equipment passed all required tests and is ready for use. "
Section 4-3-2	Power Off / Shutdown	
Section 4-7-9	OP Panel LCD Encoder Assy Validation	

8-4-12-5 Mounting Procedure

Install the new parts in the reverse order of removal.

Section 8-5
Covers

8-5-1 Left Cover

Purpose: This is a description on how to remove and replace the Left Cover.

8-5-1-1 Tools

- Common pillips screwdrivers

8-5-1-2 Needed Manpower

- 1person, 5 minutes + travel

8-5-1-3 Preparations

- Shut Down the System and switch off the Main Breaker at the rear as described in section 4-3-2 on page 3.

8-5-1-4 Removal Procedure

1.) Turn OFF the system.
2.) Unscrew three screws (1-3).
3.) Remove the Left Cover. Refer to Figure 8-48.

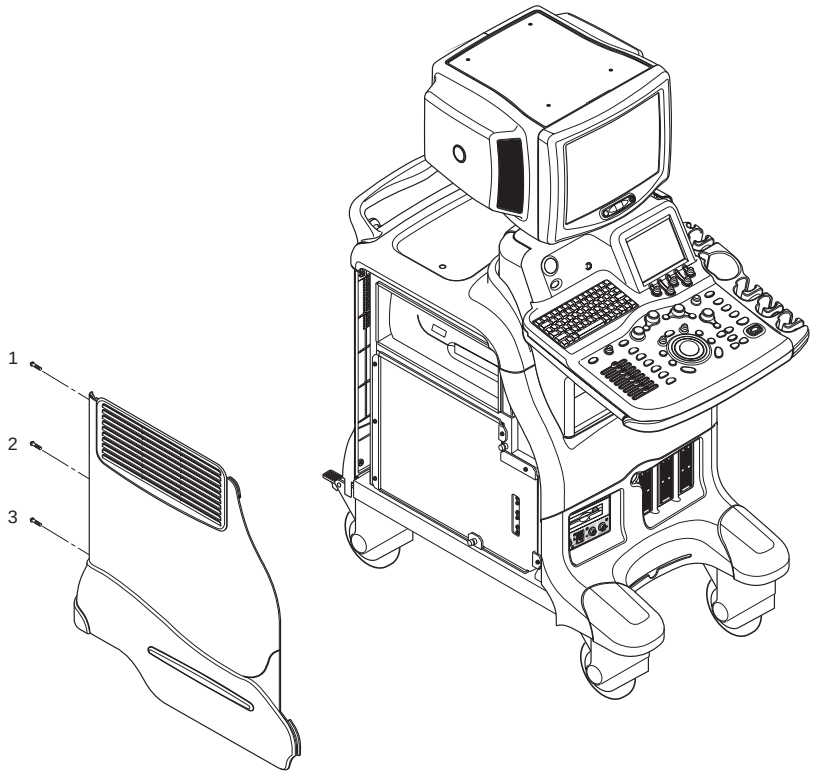


Figure 8-48 Removing the Left Cover

8-5-1-4 Removal Procedure (cont'd)

4.) Perform the following functional tests. If all are successful, include the debrief script provided below.

Table 8-20 Functional Tests

Service Manual Section	Functional Test / Diagnostic Test	Debrief Script
Section 4-3-1	Power On/Boot Up	"Service Manual, Direction 2300000, Rev 1+, Section 8-5-1. Equipment passed all required tests and is ready for use. "
Section 4-3-2	Power Off / Shutdown	
Section 4-8-2	Cover Parts Function Validation	
Section 10-5-5	Physical Inspection	

8-5-1-5 Mounting procedure

Install the new parts in the reverse order of removal.

8-5-2 Right Cover

Purpose: This is a description on how to remove and replace the Right Cover.

8-5-2-1 Tools

- Common pillips screwdrivers

8-5-2-2 Needed Manpower

- 1person, 5 minutes + travel

8-5-2-3 Preparations

- Shut Down the System and switch off the Main Breaker at the rear as described in section 4-3-2 on page 3.

8-5-2-4 Removal Procedure

1.) Turn OFF the system.
2.) Unscrew 3 screws (1-3).
3.) Remove the Right Cover. Refer to Figure 8-49.

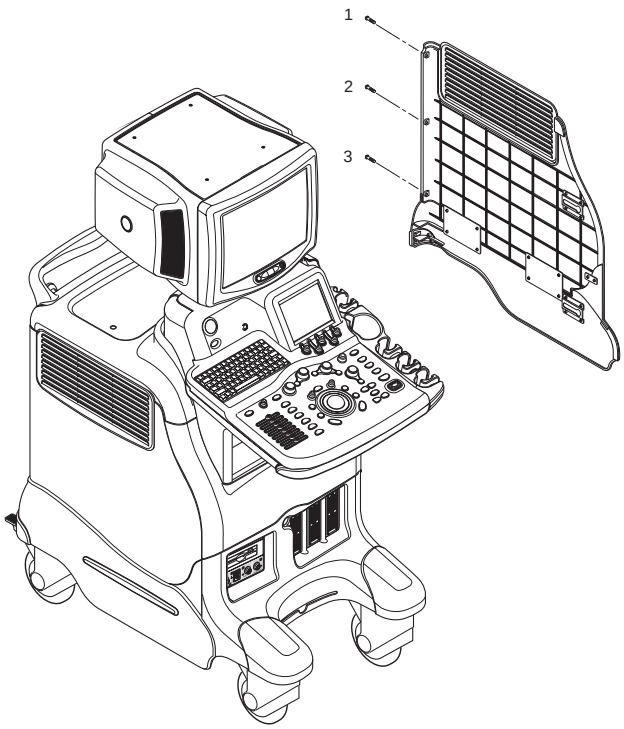


Figure 8-49 Removing the right cover

8-5-2-4 Removal Procedure (cont'd)

4.) Perform the following functional tests. If all are successful, include the debrief script provided below.

Table 8-21 Functional Tests

Service Manual Section	Functional Test / Diagnostic Test	Debrief Script
Section 4-3-1	Power On/Boot Up	"Service Manual, Direction 2300000, Rev 1+, Section 8-5-2. Equipment passed all required tests and is ready for use. "
Section 4-3-2	Power Off / Shutdown	
Section 4-8-2	Cover Parts Function Validation	
Section 10-5-5	Physical Inspection	

8-5-2-5 Mounting procedure

Install the new parts in the reverse order of removal.

8-5-3 Rear Cover

Purpose: This is a description on how to remove and replace the Rear Cover.

8-5-3-1 Tools

- Common pillips screwdrivers

8-5-3-2 Needed Manpower

- 1 persons, 15 minutes + travel

8-5-3-3 Preparations

- Shut Down the System and switch off the Main Breaker at the rear as described in section 4-3-2 on page 3.

8-5-3-4 Removal Procedure

1.) Remove the Left Cover. Refer to section 8-5-1 on page 39.
2.) Remove the Right Cover. Refer to section 8-5-2 on page 41.
3.) Unscrew six screws (1-6).
4.) Remove the Rear Cover. Refer to Figure 8-50.

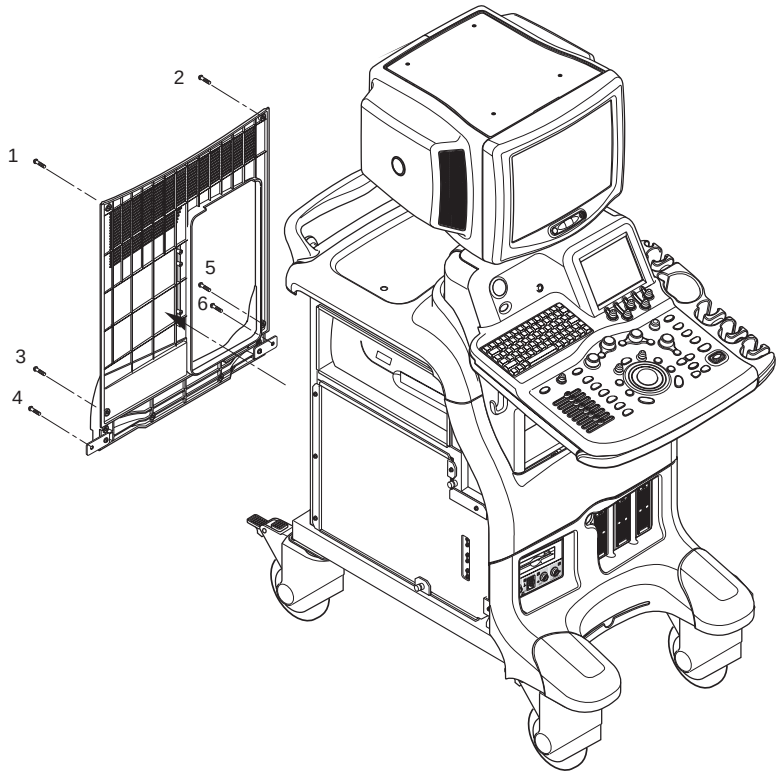


Figure 8-50 Removing the rear cover

8-5-3-4 Removal Procedure (cont'd)

5.) Perform the following functional tests. If all are successful, include the debrief script provided below.

Table 8-22 Functional Tests

Service Manual Section	Functional Test / Diagnostic Test	Debrief Script
Section 4-3-1	Power On/Boot Up	"Service Manual, Direction 2300000, Rev 1+, Section 8-5-3. Equipment passed all required tests and is ready for use. "
Section 4-3-2	Power Off / Shutdown	
Section 4-8-2	Cover Parts Function Validation	
Section 10-5-5	Physical Inspection	

8-5-3-5 Mounting procedure

Install the new parts in the reverse order of removal.

8-5-4 Rear Door Cover

Purpose: This is a description on how to remove and replace the Rear Door Cover.

8-5-4-1 Tools

- Common pillips screwdrivers

8-5-4-2 Needed Manpower

- 1person, 20 minutes + travel

8-5-4-3 Preparations

- Shut Down the System and switch off the Main Breaker at the rear as described in section 4-3-2 on page 3.

8-5-4-4 Removal Procedure

1.) Remove the Left Cover. Refer to section 8-5-1 on page 39.
2.) Remove the Right Cover. Refer to section 8-5-2 on page 41.
3.) Remove the Rear Cover. Refer to section 8-5-3 on page 43.
4.) Unscrew four screws (1-4). Refer to Figure 8-51.
5.) Remove hinges from the Rear Door Cover.
6.) Remove the Rear Door Cover.

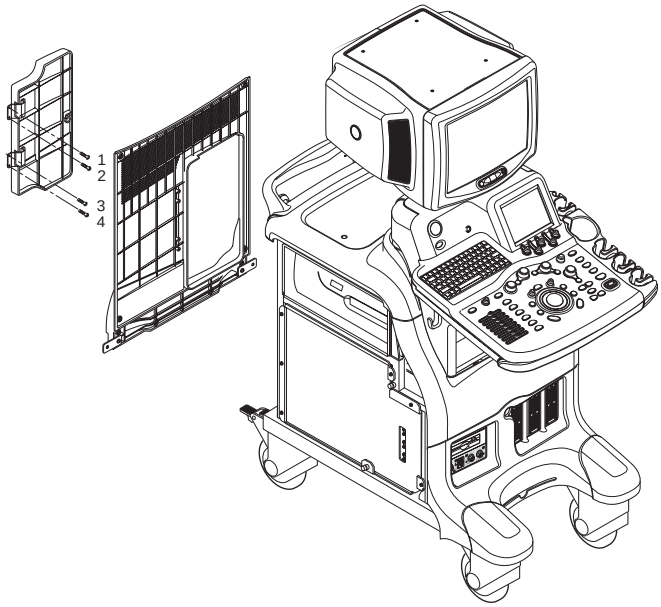


Figure 8-51 Removing the Rear Door Cover

8-5-4-4 Removal Procedure (cont'd)

7.) Perform the following functional tests. If all are successful, include the debrief script provided below.

Table 8-23 Functional Tests

Service Manual Section	Functional Test / Diagnostic Test	Debrief Script
Section 4-3-1	Power On/Boot Up	"Service Manual, Direction 2300000, Rev 1+, Section 8-5-4. Equipment passed all required tests and is ready for use. "
Section 4-3-2	Power Off / Shutdown	
Section 4-8-2	Cover Parts Function Validation	
Section 10-5-5	Physical Inspection	

8-5-4-5 Mounting procedure

Install the new parts in the reverse order of removal.

8-5-5 Top Cover

Purpose: This is a description on how to remove and replace the Top Cover.

8-5-5-1 Tools

- Common pillips screwdrivers

8-5-5-2 Needed Manpower

- 1 person, 20 minutes + travel

8-5-5-3 Preparations

- Shut Down the System and switch off the Main Breaker at the rear as described in section 4-3-2 on page 3.

8-5-5-4 Removal Procedure

1.) Remove the Left Cover. Refer to section 8-5-1 on page 39.
2.) Remove the Right Cover. Refer to section 8-5-2 on page 41.
3.) Remove the Rear Cover. Refer to section 8-5-3 on page 43.
4.) Unscrew two screws (1-2) from the top side of the Top cover. Refer to Figure 8-52.

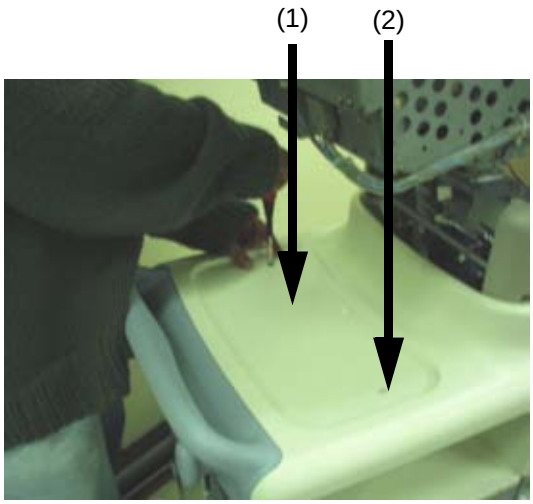


Figure 8-52 Unscrew 2 screws from the Top cover

8-5-5-4 Removal Procedure (cont'd)

5.) Unscrew four screws (3-6) from the bottom of the Top cover. Refer to Figure 8-53.

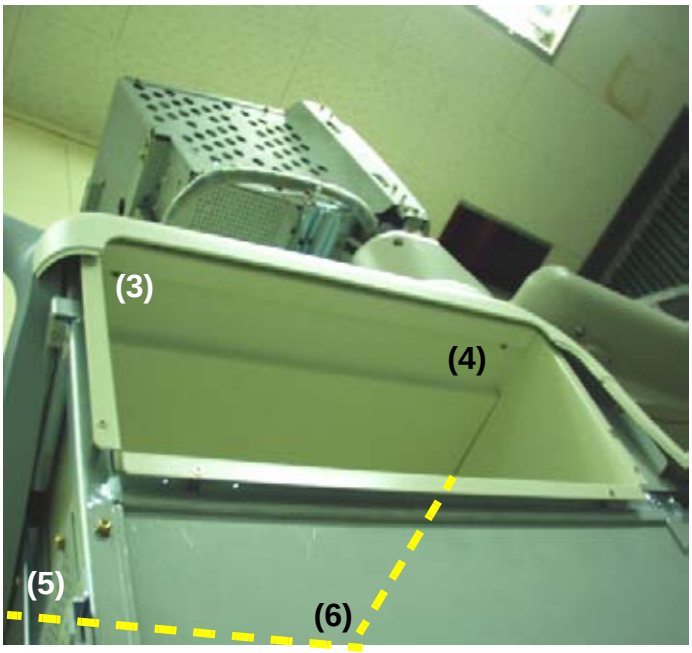


Figure 8-53 Unscrew 4 screws from the bottom

6.) Perform the following functional tests. If all are successful, include the debrief script provided below.

Table 8-24 Functional Tests

Service Manual Section	Functional Test / Diagnostic Test	Debrief Script
Section 4-3-1	Power On/Boot Up	"Service Manual, Direction 2300000, Rev 1+, Section 8-5-5. Equipment passed all required tests and is ready for use. "
Section 4-3-2	Power Off / Shutdown	
Section 4-8-2	Cover Parts Function Validation	
Section 10-5-5	Physical Inspection	

8-5-5-5 Mounting procedure

Install the new parts in the reverse order of removal.

8-5-6 Front Base Cover

Purpose: This is a description on how to remove and replace the Front Base Cover.

8-5-6-1 Tools

- Common pillips screwdrivers

8-5-6-2 Needed Manpower

- 1person, 15 minutes + travel

8-5-6-3 Preparations

- Shut Down the System and switch off the Main Breaker at the rear as described in section 4-3-2 on page 3.

8-5-6-4 Removal Procedure

1.) Remove the Left Cover. Refer to section 8-5-1 on page 39.
2.) Remove the Right Cover. Refer to section 8-5-2 on page 41.
3.) Unscrew four screws (1-4). Refer to Figure 8-54.

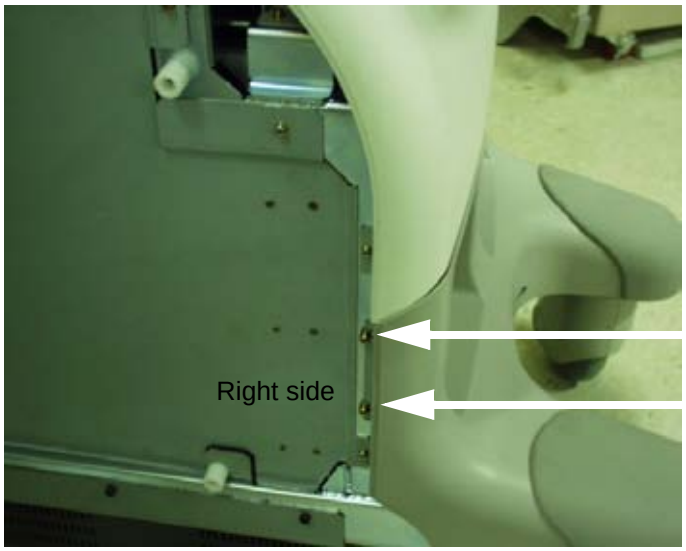


Figure 8-54 Unscrew 2 screws on the Right side

8-5-6-4 Removal Procedure (cont'd)

4.) Remove the Front Base Cover. Refer to Figure 8-55.

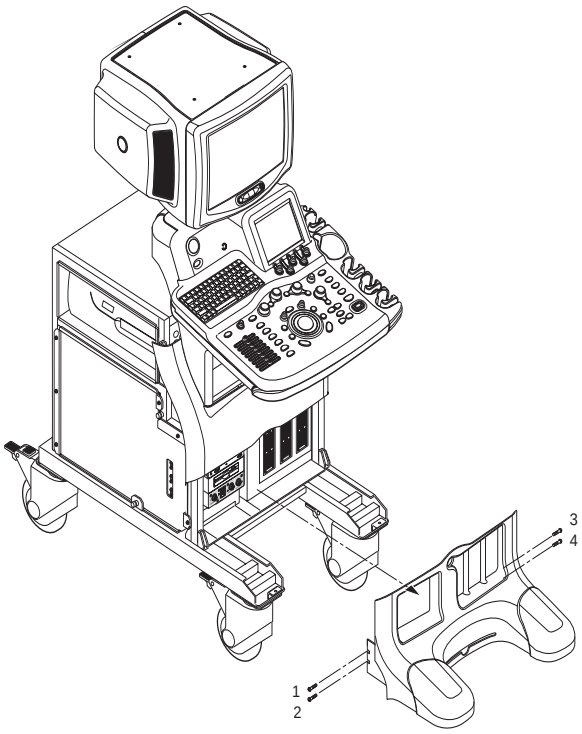


Figure 8-55 Removing the Front Base Cover

5.) Perform the following functional tests. If all are successful, include the debrief script provided below.

Table 8-25 Functional Tests

Service Manual Section	Functional Test / Diagnostic Test	Debrief Script
Section 4-3-1	Power On/Boot Up	"Service Manual, Direction 2300000, Rev 1+, Section 8-5-6. Equipment passed all required tests and is ready for use. "
Section 4-3-2	Power Off / Shutdown	
Section 4-8-2	Cover Parts Function Validation	
Section 10-5-5	Physical Inspection	

8-5-6-5 Mounting procedure

Install the new parts in the reverse order of removal.

8-5-7 Front Cover

Purpose: This is a description on how to remove and replace the Front Cover.

8-5-7-1 Tools

- Common pillips screwdrivers

8-5-7-2 Needed Manpower

- 1person, 20 minutes + travel

8-5-7-3 Preparations

- Shut Down the System and switch off the Main Breaker at the rear as described in section 4-3-2 on page 3.

8-5-7-4 Removal Procedure

1.) Remove the Left Cover. Refer to section 8-5-1 on page 39.
2.) Remove the Right Cover. Refer to section 8-5-2 on page 41.
3.) Remove the Front Base Cover. Refer to section 8-5-7 on page 51.
4.) Unscrew four screws (1-4). Refer to Figure 8-56.

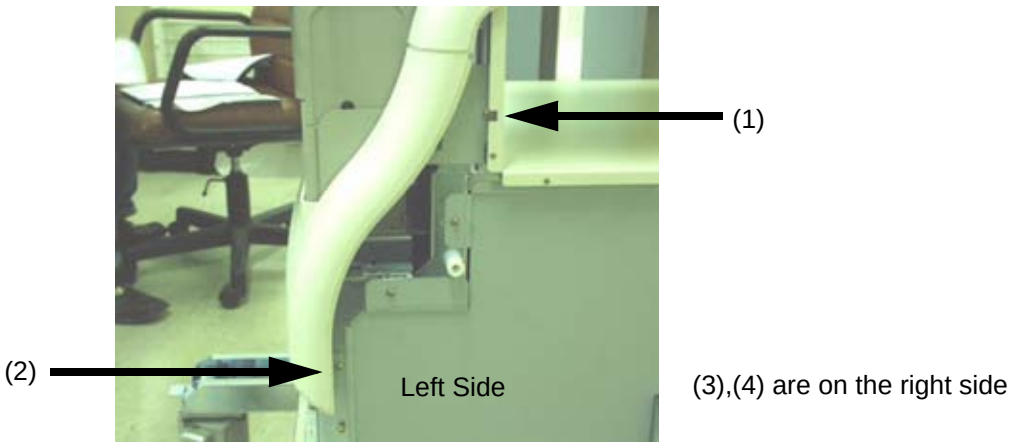


Figure 8-56 Unscrew 2 screws on the left side

5.) Remove the Front Cover.
6.) Perform the following functional tests. If all are successful, include the debrief script provided below.

Table 8-26 Functional Tests

Service Manual Section	Functional Test / Diagnostic Test	Debrief Script
Section 4-3-1	Power On/Boot Up	"Service Manual, Direction 2300000, Rev 1+, Section 8-5-7. Equipment passed all required tests and is ready for use. "
Section 4-3-2	Power Off / Shutdown	
Section 4-8-2	Cover Parts Function Validation	
Section 10-5-5	Physical Inspection	

8-5-7-5 Mounting procedure

Install the new parts in the reverse order of removal.

8-5-8 OP Side L Cover

Purpose: This is a description on how to remove and replace the OP Side L Cover.

8-5-8-1 Tools

- Common pillips screwdrivers
- Allen/Unbraco wrench

8-5-8-2 Needed Manpower

- 1person, 25 minutes + travel

8-5-8-3 Preparations

- Shut Down the System and switch off the Main Breaker at the rear as described in section 4-3-2 on page 3.

8-5-8-4 Removal Procedure

1.) Remove the Left Cover. Refer to section 8-5-1 on page 39.
2.) Remove the Right Cover. Refer to section 8-5-2 on page 41.
3.) Remove the Front Base Cover. Refer to section 8-5-7 on page 51.
4.) Remove the Front Cover. Refer to section 8-5-7 on page 51.
5.) Remove the Keyboard. Refer to section 8-4-1 on page 15.
6.) Unscrew two (2) screws (1-2) and remove OP Curtain L Bracket. Refer to Figure 8-57.

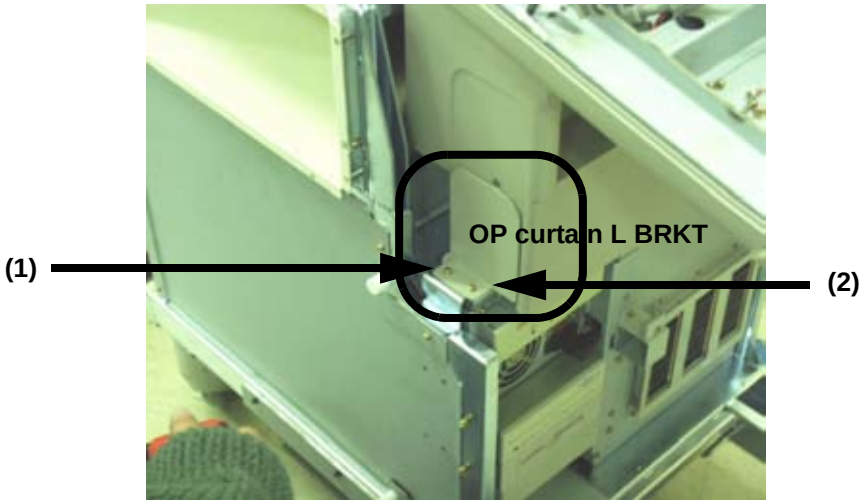


Figure 8-57 Removing OP Curtain L BRKT

8-5-8-4 Removal Procedure (cont'd)

7.) Unscrew five screws (3-7) and remove OP Side L Cover. Refer to Figure 8-58.

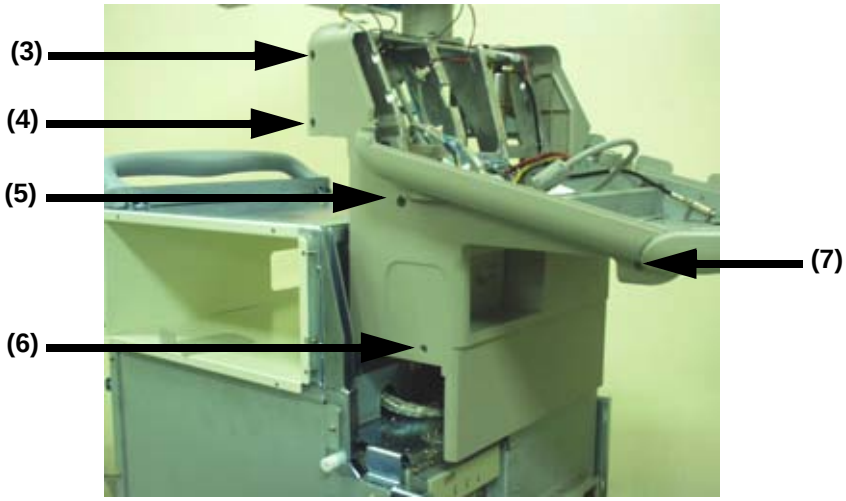


Figure 8-58 Unscrew 5 screws to remove OP L Cover

NOTE: Different screw in length is used in the location Number (7).

8.) Perform the following functional tests. If all are successful, include the debrief script provided below.

Table 8-27 Functional Tests

Service Manual Section	Functional Test / Diagnostic Test	Debrief Script
Section 4-3-1	Power On/Boot Up	"Service Manual, Direction 2300000, Rev 1+, Section 8-5-8. Equipment passed all required tests and is ready for use. "
Section 4-3-2	Power Off / Shutdown	
Section 4-8-2	Cover Parts Function Validation	
Section 10-5-5	Physical Inspection	

8-5-8-5 Mounting procedure

Install the new parts in the reverse order of removal.

8-5-9 OP Side R Cover

Purpose: This is a description on how to remove and replace the OP Side R Cover.

8-5-9-1 Tools

- Common pillips screwdrivers
- Allen/Unbraco wrench

8-5-9-2 Needed Manpower

- 1person, 25 minutes + travel

8-5-9-3 Preparations

- Shut Down the System and switch off the Main Breaker at the rear as described in section 4-3-2 on page 3.

8-5-9-4 Removal Procedure

1.) Remove the Left Cover. Refer to section 8-5-1 on page 39.
2.) Remove the Right Cover. Refer to section 8-5-2 on page 41.
3.) Remove the Front Base Cover. Refer to section 8-5-7 on page 51.
4.) Remove the Front Cover. Refer to section 8-5-7 on page 51 .
5.) Remove the Keyboard Assy. Refer to section 8-4-1 on page 15.
6.) Unscrew five (5) screws (1-5) and remove the Probe Holder Bracket. Refer to Figure 8-59.

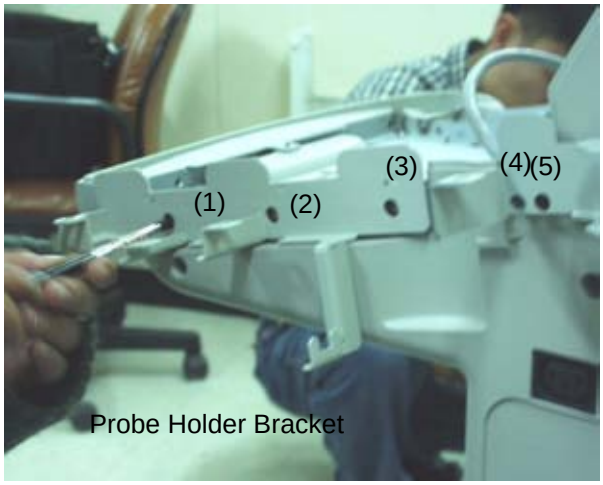
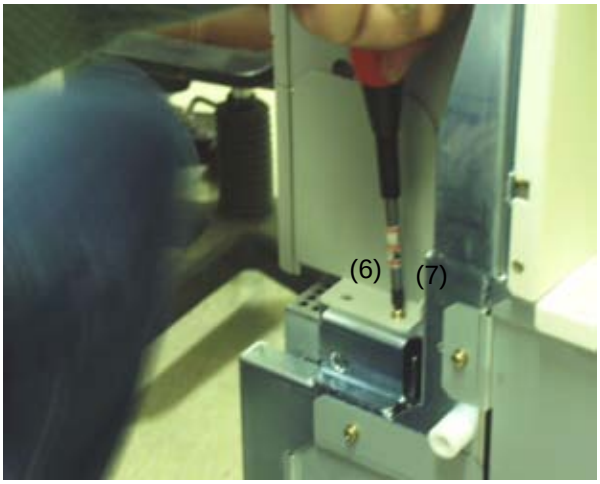


Figure 8-59 Removing the Probe Holder Bracket

8-5-9-4 Removal Procedure (cont'd)

7.) Unscrew two (2) screws (6-7) and remove the OP Curtain R Bracket. Refer to Figure 8-60.



OP Curtain R Bracket

Figure 8-60 Removing the OP Curtain R Bracket

NOTE: Different screw in length is used in the location Number (7).

8.) Unscrew six (6) screws (8-13) and remove the OP Side R Cover. Refer to Figure 8-61.

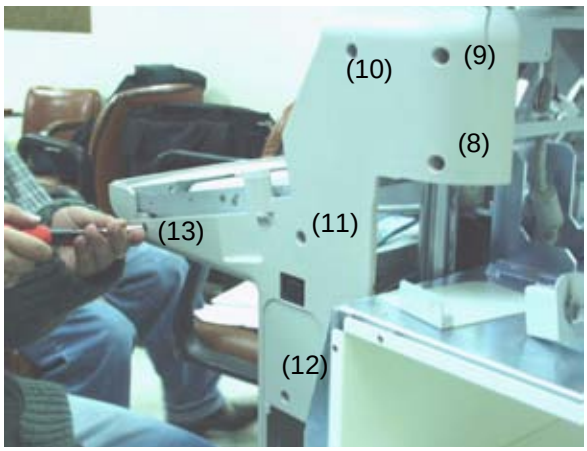


Figure 8-61 Removing the OP Side R Cover

9.) Perform the following functional tests. If all are successful, include the debrief script provided below.

Table 8-28 Functional Tests

Service Manual Section	Functional Test / Diagnostic Test	Debrief Script
Section 4-3-1	Power On/Boot Up	"Service Manual, Direction 2300000, Rev 1+, Section 8-5-9. Equipment passed all required tests and is ready for use. "
Section 4-3-2	Power Off / Shutdown	
Section 4-8-2	Cover Parts Function Validation	
Section 10-5-5	Physical Inspection	

8-5-9-5 Mounting procedure

Install the new parts in the reverse order of removal.

8-5-10 OP Rear Cover

Purpose: This is a description on how to remove and replace the OP Rear Cover.

8-5-10-1 Tools

- Common pillips screwdrivers
- Allen/Unbraco wrench

8-5-10-2 Needed Manpower

- 1person, 15 minutes + travel

8-5-10-3 Preparations

- Shut Down the System and switch off the Main Breaker at the rear as described in section 4-3-2 on page 3.

8-5-10-4 Removal Procedure

1.) Unscrew two screws (1-2).

NOTE: A coin can be used for a screwdriver to unscrew.

2.) Remove OP Rear Cover. Refer to Figure 8-62.

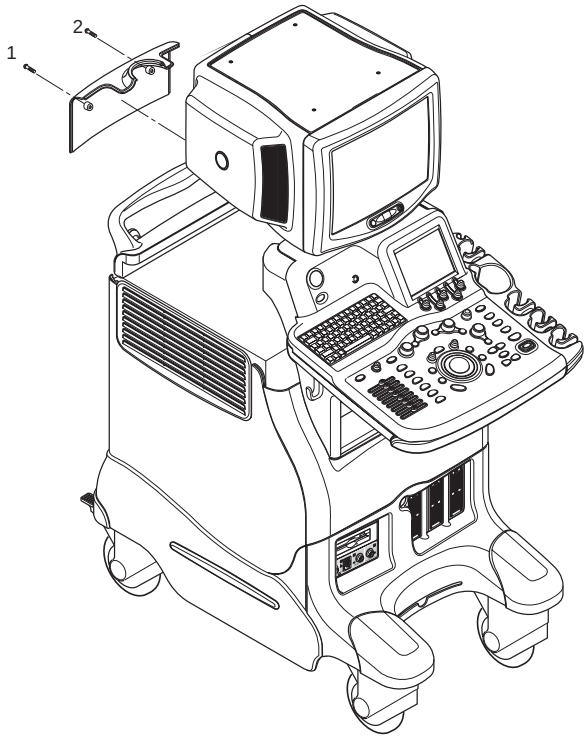


Figure 8-62 Removing OP Rear Cover

8-5-10-4 Removal Procedure (cont'd)

3.) Perform the following functional tests. If all are successful, include the debrief script provided below.

Table 8-29 Functional Tests

Service Manual Section	Functional Test / Diagnostic Test	Debrief Script
Section 4-3-1	Power On/Boot Up	"Service Manual, Direction 2300000, Rev 1+, Section 8-5-10. Equipment passed all required tests and is ready for use. "
Section 4-3-2	Power Off / Shutdown	
Section 4-8-2	Cover Parts Function Validation	
Section 10-5-5	Physical Inspection	

8-5-10-5 Mounting procedure

Install the new parts in the reverse order of removal.

8-5-11 OP Bottom Cover

Purpose: This is a description on how to remove and replace the OP Bottom Cover.

8-5-11-1 Tools

- Common pillips screwdrivers
- Allen/Unbraco wrench

8-5-11-2 Needed Manpower

- 1 persons, 25 minutes + travel

8-5-11-3 Preparations

- Shut Down the System and switch off the Main Breaker at the rear as described in section 4-3-2 on page 3.

8-5-11-4 Removal Procedure

1.) Remove the Left Cover. Refer to section 8-5-1 on page 39.
2.) Remove the Right Cover. Refer to section 8-5-2 on page 41.
3.) Remove the Front Base Cover. Refer to 1.) section 8-5-6 on page 49.
4.) Remove the Front Cover. Refer to section 8-5-7 on page 51.
5.) Remove the OP Side L Cover. Refer to section 8-5-8 on page 52.
6.) Remove the OP Side R Cover. Refer to section 8-5-9 on page 54.
7.) Unscrew four (4) screws (1-4). Refer to Figure 8-63.

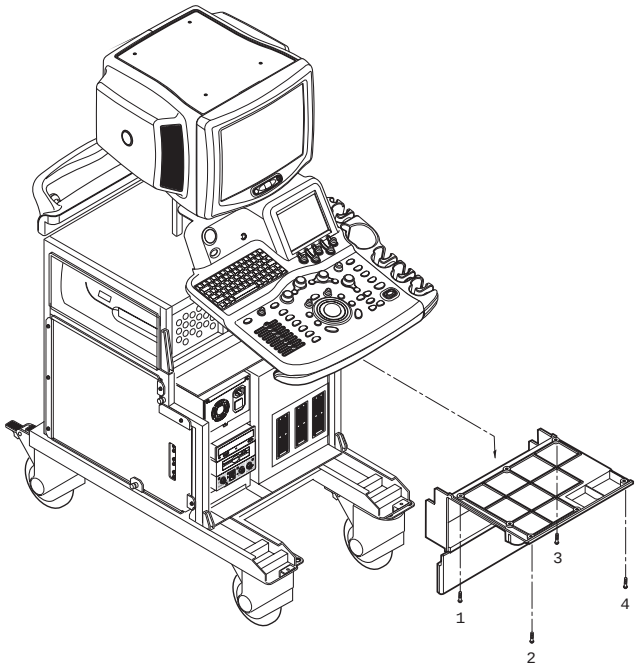


Figure 8-63 Removing the OP Bottom Cover

8.) Remove the OP Bottom Cover.

8-5-11-4 Removal Procedure (cont'd)

9.) Perform the following functional tests. If all are successful, include the debrief script provided below.

Table 8-30 Functional Tests

Service Manual Section	Functional Test / Diagnostic Test	Debrief Script
Section 4-3-1	Power On/Boot Up	"Service Manual, Direction 2300000, Rev 1+, Section 8-5-11. Equipment passed all required tests and is ready for use. "
Section 4-3-2	Power Off / Shutdown	
Section 4-8-2	Cover Parts Function Validation	
Section 10-5-5	Physical Inspection	

8-5-11-5 Mounting procedure

Install the new parts in the reverse order of removal.

8-5-12 OP Curtain Cover

Purpose: This is a description on how to remove and replace the OP Curtain Cover.

8-5-12-1 Tools

- Common pillips screwdrivers
- Allen/Unbraco wrench

8-5-12-2 Needed Manpower

- 1 person, 25 minutes + travel

8-5-12-3 Preparations

- Shut Down the System and switch off the Main Breaker at the rear as described in section 4-3-2 on page 3.

8-5-12-4 Removal Procedure

1.) Remove the Left Cover. Refer to section 8-5-1 on page 39.
2.) Remove the Right Cover. Refer to section 8-5-2 on page 41.
3.) Remove the Front Base Cover. Refer to 1.) section 8-5-6 on page 49.
4.) Remove the Front Cover. Refer to section 8-5-7 on page 51.
5.) Remove the OP Side L Cover. Refer to section 8-5-8 on page 52.
6.) Remove the OP Side R Cover. Refer to section 8-5-9 on page 54.
7.) Remove the OP Bottom Cover. Refer to section 8-5-11 on page 58
8.) Unscrew six screws from the OP Curtain Cover. Refer to Figure 8-64.

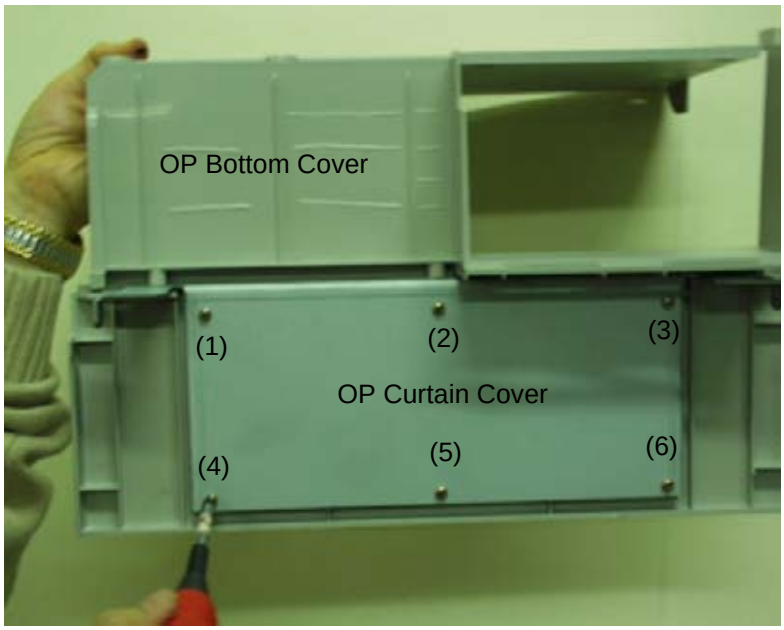


Figure 8-64 Unscrew 6 screws to remove the OP Curtain Cover

8-5-12-4 Removal Procedure (cont'd)

9.) Remove the OP Curtain Cover. Refer to Figure 8-65.

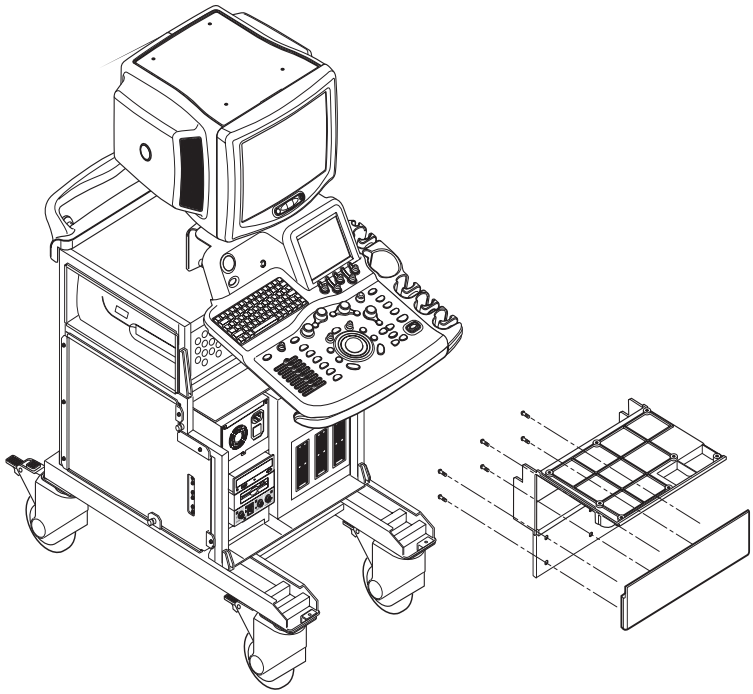


Figure 8-65 Remove the OP Curtain Cover

10.) Perform the following functional tests. If all are successful, include the debrief script provided below.

Table 8-31 Functional Tests

Service Manual Section	Functional Test / Diagnostic Test	Debrief Script
Section 4-3-1	Power On/Boot Up	"Service Manual, Direction 2300000, Rev 1+, Section 8-5-12. Equipment passed all required tests and is ready for use. "
Section 4-3-2	Power Off / Shutdown	
Section 4-8-2	Cover Parts Function Validation	
Section 10-5-5	Physical Inspection	

8-5-12-5 Mounting procedure

Install the new parts in the reverse order of removal.

8-5-13 EMI Cover L

Purpose: This is a description on how to remove and replace the EMI Cover L.

8-5-13-1 Tools

- Common pillips screwdrivers
- Allen/Unbraco wrench

8-5-13-2 Needed Manpower

- 1 person, 5 minutes + travel

8-5-13-3 Preparations

- Shut Down the System and switch off the Main Breaker at the rear as described in section 4-3-2 on page 3.

8-5-13-4 Removal Procedure

1.) Remove the Left Cover. Refer to section 8-5-1 on page 39.
2.) Unscrew seven screws (1-7).
3.) Remove the EMI Cover L. Refer to Figure 8-66.

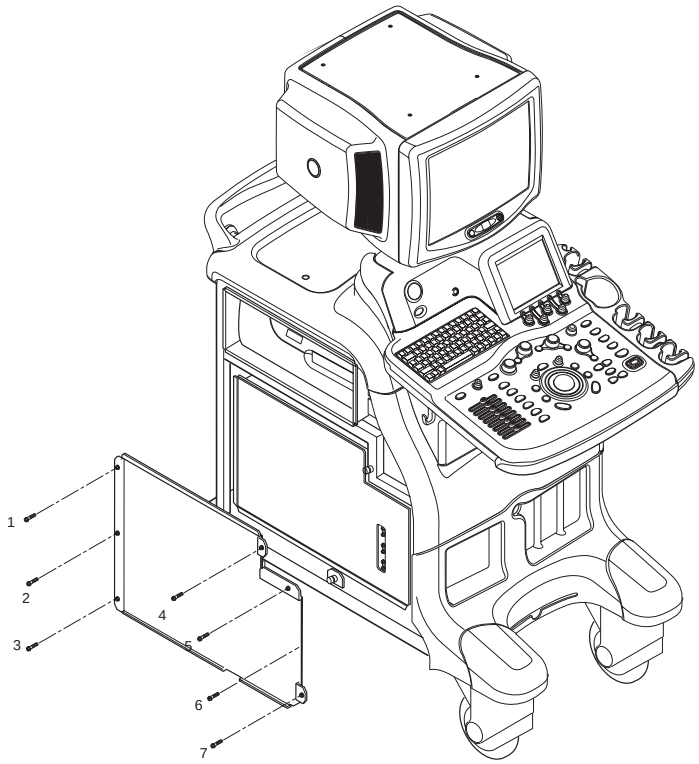


Figure 8-66 Removing the EMI Cover L

8-5-13-4 Removal Procedure (cont'd)

4.) Perform the following functional tests. If all are successful, include the debrief script provided below.

Table 8-32 Functional Tests

Service Manual Section	Functional Test / Diagnostic Test	Debrief Script
Section 4-3-1	Power On/Boot Up	"Service Manual, Direction 2300000, Rev 1+, Section 8-5-13. Equipment passed all required tests and is ready for use. "
Section 4-3-2	Power Off / Shutdown	
Section 4-8-2	Cover Parts Function Validation	
Section 10-5-5	Physical Inspection	

8-5-13-5 Mounting procedure

Install the new parts in the reverse order of removal.

8-5-14 EMI Cover R

Purpose: This is a description on how to remove and replace the EMI Cover R.

8-5-14-1 Tools

- Common pillips screwdrivers
- Allen/Unbraco wrench

8-5-14-2 Needed Manpower

- 1person, 15 minutes + travel

8-5-14-3 Preparations

- Shut Down the System and switch off the Main Breaker at the rear as described in section 4-3-2 on page 3.

8-5-14-4 Removal Procedure

1.) Remove the Right Cover. Refer to section 8-5-2 on page 41.
2.) Unscrew seven (7) screws (1-7).
3.) Remove the EMI Cover R. Refer to Figure 8-67.

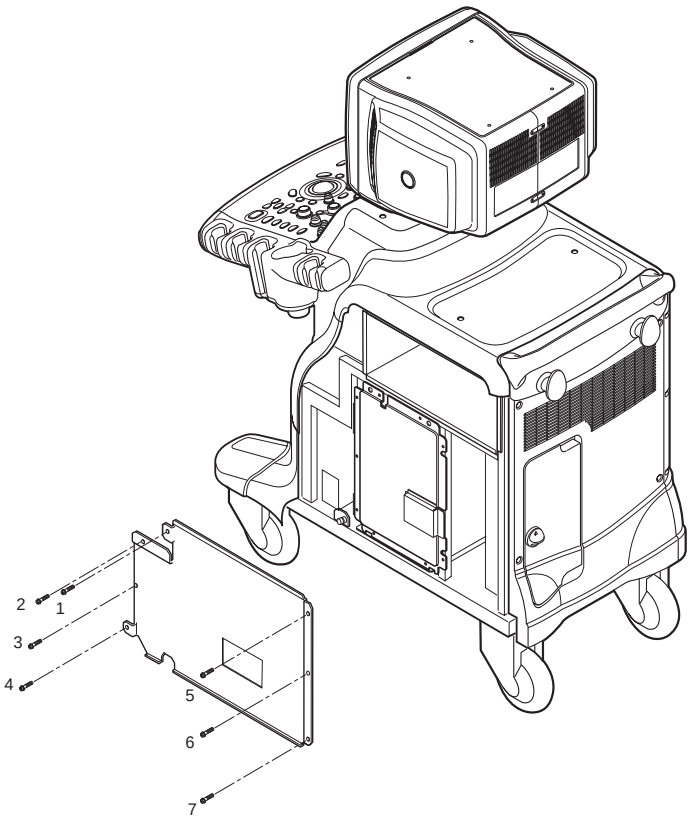


Figure 8-67 Removing the EMI Cover R

8-5-14-4 Removal Procedure (cont'd)

4.) Perform the following functional tests. If all are successful, include the debrief script provided below.

Table 8-33 Functional Tests

Service Manual Section	Functional Test / Diagnostic Test	Debrief Script
Section 4-3-1	Power On/Boot Up	"Service Manual, Direction 2300000, Rev 1+, Section 8-5-14. Equipment passed all required tests and is ready for use. "
Section 4-3-2	Power Off / Shutdown	
Section 4-8-2	Cover Parts Function Validation	
Section 10-5-5	Physical Inspection	

8-5-14-5 Mounting procedure

Install the new parts in the reverse order of removal.

8-5-15 Side Cap

Purpose: This is a description on how to remove and replace the Side Cap.

8-5-15-1 Tools

- Not required

8-5-15-2 Needed Manpower

- 1 persons, 3 minute + travel

8-5-15-3 Preparations

8-5-15-4 Removal Procedure

1.) Remove the Left Cover. Refer to section 8-5-1 on page 39.
2.) Pull the Side Cap upward from the Left Cover.
3.) Remove the Right Cover. Refer to Right Cover on section 8-5-2 on page 41.
4.) Pull the Side Cap upward from the Right Cover. Refer to Figure 8-68.

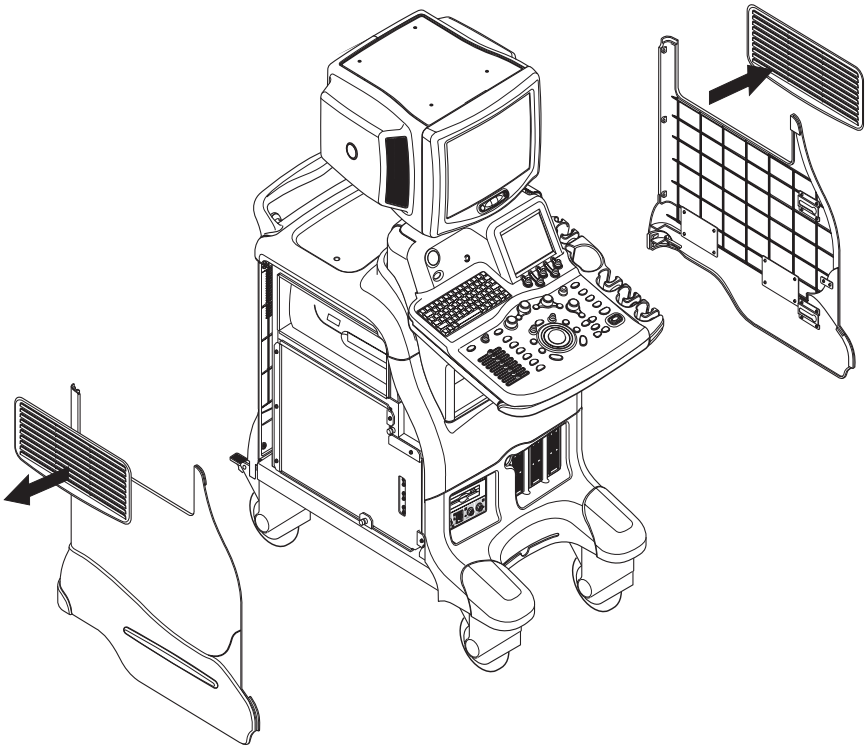


Figure 8-68 Removing Side Caps

8-5-15-4 Removal Procedure (cont'd)

5.) Perform the following functional tests. If all are successful, include the debrief script provided below.

Table 8-34 Functional Tests

Service Manual Section	Functional Test / Diagnostic Test	Debrief Script
Section 4-3-1	Power On/Boot Up	"Service Manual, Direction 2300000, Rev 1+, Section 8-5-15. Equipment passed all required tests and is ready for use. "
Section 4-3-2	Power Off / Shutdown	
Section 4-8-2	Cover Parts Function Validation	
Section 10-5-5	Physical Inspection	

8-5-15-5 Mounting procedure

Install the new parts in the reverse order of removal.

8-5-16 Side Fringe

Purpose: This is a description on how to remove and replace the Side Fringe.

8-5-16-1 Tools

- Not required.

8-5-16-2 Needed Manpower

- 1 persons, 3 minute + travel

8-5-16-3 Preparations

8-5-16-4 Removal Procedure

1.) Remove the Left Cover. Refer to section 8-5-1 on page 39.
2.) Pull the Side Fringe upward from the Left Cover.
3.) Remove the Right Cover. Refer to Right Cover on section 8-5-2 on page 41.
4.) Pull the Side Fringe upward from the Right Cover. Refer to Figure 8-69.

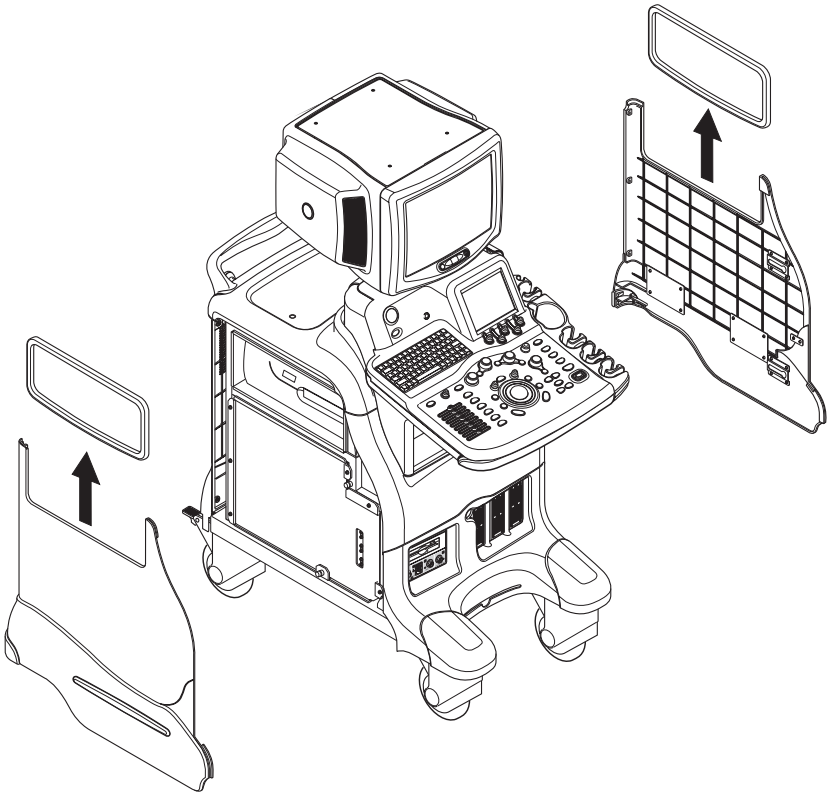


Figure 8-69 Removing the Side Caps

8-5-16-4 Removal Procedure (cont'd)

5.) Perform the following functional tests. If all are successful, include the debrief script provided below.

Table 8-35 Functional Tests

Service Manual Section	Functional Test / Diagnostic Test	Debrief Script
Section 4-3-1	Power On/Boot Up	"Service Manual, Direction 2300000, Rev 1+, Section 8-5-16. Equipment passed all required tests and is ready for use. "
Section 4-3-2	Power Off / Shutdown	
Section 4-8-2	Cover Parts Function Validation	
Section 10-5-5	Physical Inspection	

8-5-16-5 Mounting procedure

Install the new parts in the reverse order of removal.

Section 8-6
Body Block

8-6-1 Rear Handle

Purpose: This is a description on how to remove and replace the Rear Handle.

8-6-1-1 Tools

- Common pillips screwdrivers
- Allen/Unbraco wrench

8-6-1-2 Needed Manpower

- 1person, 25 minutes + travel

8-6-1-3 Preparations

- Shut Down the System and switch off the Main Breaker at the rear as described in section 4-3-2 on page 3.

8-6-1-4 Removal Procedure

1.) Remove the Left Cover. Refer to section 8-5-1 on page 39.
2.) Remove the Right Cover. Refer to section 8-5-2 on page 41.
3.) Remove the Rear Cover. Refer to section 8-5-3 on page 43.
4.) Remove the Top Cover. Refer to section 8-5-5 on page 47.
5.) Unscrew four (4) screws (1-4) to remove peri rear bracket. Refer to Figure 8-70.

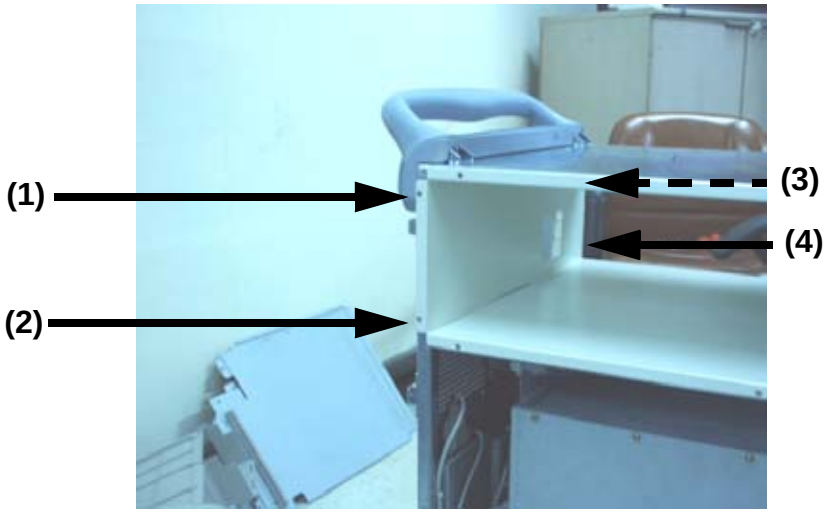


Figure 8-70 Removing the Peri Rear Bracket

8-6-1-4 Removal Procedure (cont'd)

6.) Unscrew two (2) screws (5-6) from the rear side of handle. Refer to Figure 8-71.

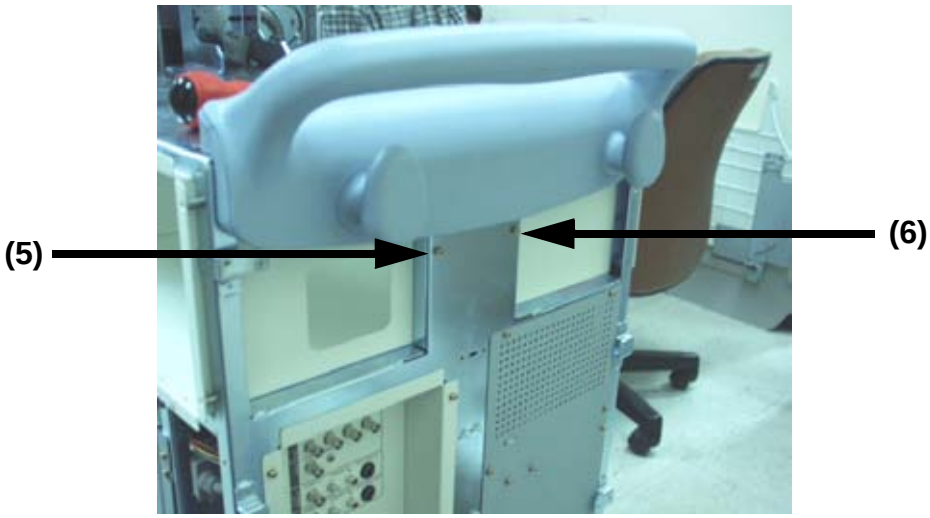


Figure 8-71 Unscrew two screws

7.) Unscrew four (4) screws (7-10) above top plate surface on the Rear Handle.

8.) Unscrew four (4) screws (11-14) below top plate surface on the Rear Handle. Refer to Figure 8-72.

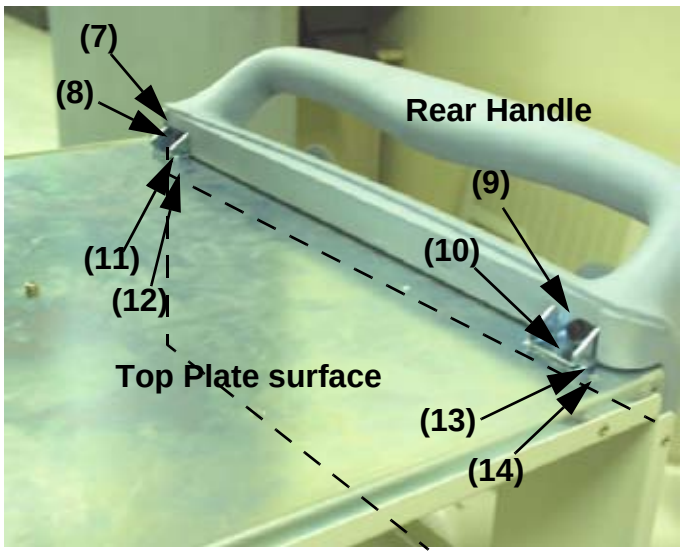


Figure 8-72 Removing the Rear Handle

9.) Remove the Rear Handle.

8-6-1-4 Removal Procedure (cont'd)

10.) Perform the following functional tests. If all are successful, include the debrief script provided below.

Table 8-36 Functional Tests

Service Manual Section	Functional Test / Diagnostic Test	Debrief Script
Section 4-3-1	Power On/Boot Up	"Service Manual, Direction 2300000, Rev 1+, Section 8-6-1. Equipment passed all required tests and is ready for use. "
Section 4-3-2	Power Off / Shutdown	
Section 4-8-2	Cover Parts Function Validation	
Section 10-5-5	Physical Inspection	

8-6-1-5 Mounting procedure

Install the new parts in the reverse order of removal.

8-6-2 Rear Panel Assy

Purpose: This is a description on how to remove and replace the Rear Panel Assy.

8-6-2-1 Tools

- Common pillips screwdrivers
- Allen/Unbraco wrench

8-6-2-2 Needed Manpower

- 1 persons, 40 minutes + travel

8-6-2-3 Preparations

- Shut Down the System and switch off the Main Breaker at the rear as described in section 4-3-2 on page 3.

8-6-2-4 Removal Procedure

1.) Remove the Left Cover. Refer to section 8-5-1 on page 39.
2.) Remove the Right Cover. Refer to section 8-5-2 on page 41.
3.) Remove the Rear Cover. Refer to section 8-5-3 on page 43.
4.) Unscrew eight (8) screws (5-12) to remove the EMI rear Bracket. Refer to Figure 8-73.

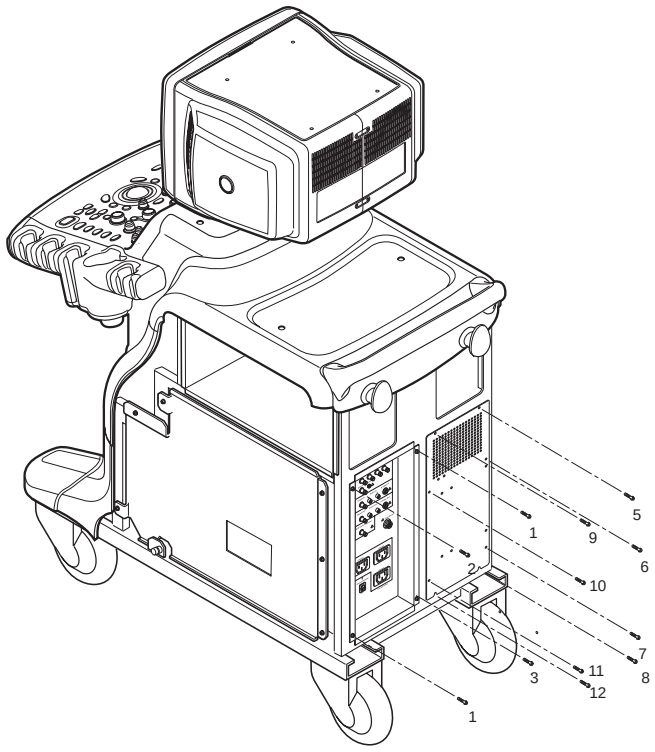
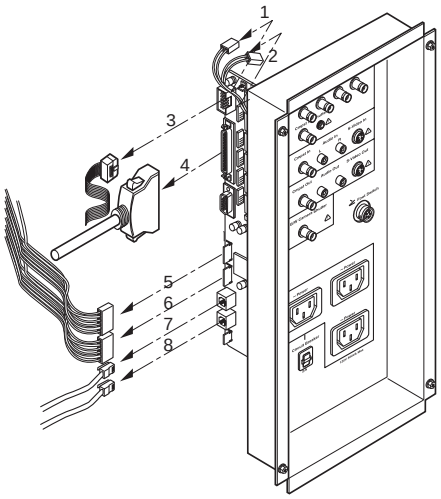


Figure 8-73 Unscrew 8 screws to remove EMI brkt

8-6-2-4 Removal Procedure (cont'd)

5.) Disconnect 8 connectors (1-8) from the left side of the Panel. Refer to Figure 8-74.



1. External VGA Connector
2. Isolated Power Connector
3. Power Control Connector
4. Rear Digital Signal Connector
5. Main S/W and HDD LED Signal Connector
6. USB Down Stream Connector
7. InSite Connector
8. Ethernet Connector

Figure 8-74 Disconnecting 8 Connectors

6.) Disconnect 9 connectors (9-17) from the right side of the Panel. Refer to Figure 8-75.

9. Rear Analog Signal Connector
10. B/W Printer Power Connector
11. Line-In Connector
12. Line-Out Connetor
13. MIC In Connector
14. Sound Connector
15. Foot S/W Connector
16. Rear Panel Power-In Connector
17. Rear Panel Power-Out Connector

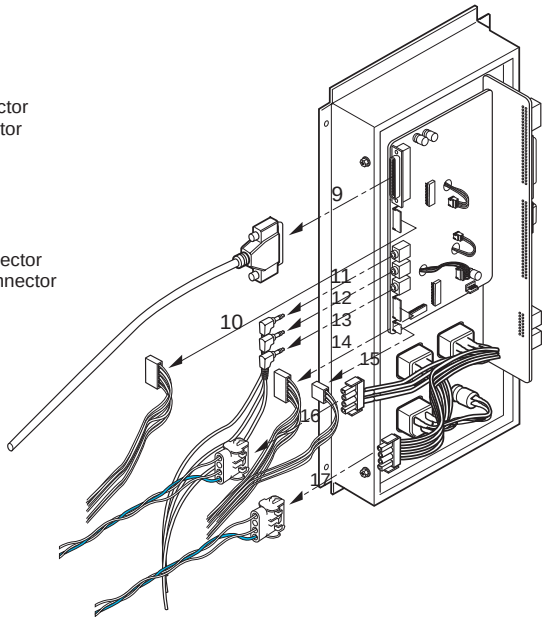


Figure 8-75 Disconnecting 9 connectors

7.) Remove the Rear Panel Assy.

8-6-2-4 Removal Procedure (cont'd)

8.) Perform the following functional tests. If all are successful, include the debrief script provided below.

Table 8-37 Functional Tests

Service Manual Section	Functional Test / Diagnostic Test	Debrief Script
Section 4-3-1	Power On/Boot Up	"Service Manual, Direction 2300000, Rev 1+, Section 8-6-2. Equipment passed all required tests and is ready for use. "
Section 4-3-2	Power Off / Shutdown	
Section 4-8-2	Cover Parts Function Validation	
Section 10-5-5	Physical Inspection	

8-6-2-5 Mounting procedure

Install the new parts in the reverse order of removal.

8-6-2-6 Replace the EEPROM on the RDI Assy in the rear panel assy

1.) Rear panel assy include the eeprom which have the system serial number information.

2.) If the rear panel assy would be replaced with other one, the eeprom in the rear panel assy should be moved to new assy from old one.

3.) This eeprom is very important because the system serial number information in the eeprom is the key information for system software boot up.

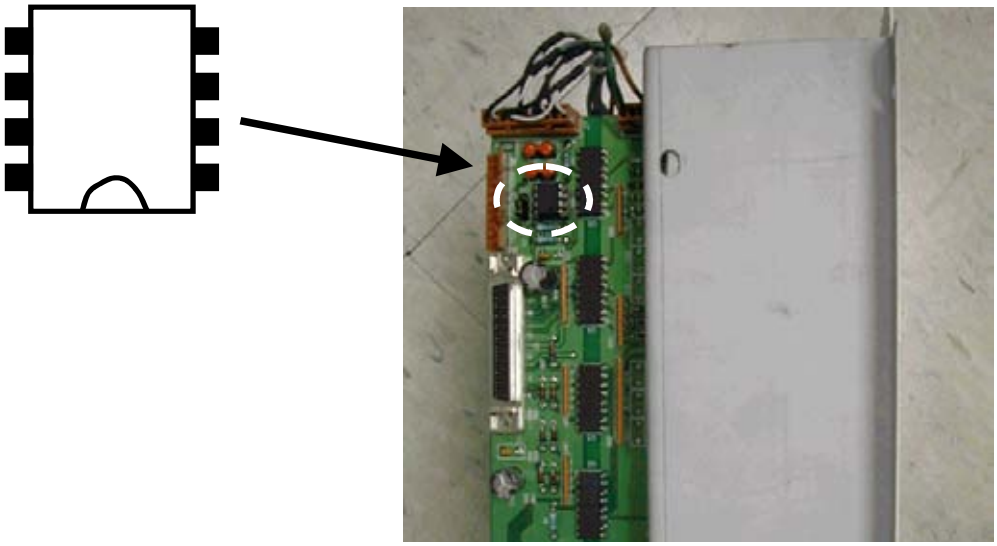


Figure 8-76 EEPROM in the Rear Panel Assy

8-6-2-7 How to Check and write the system serial number on EEPROM

NOTE: Be cafeful to keep the tap direction of the eeprom when install the eeprom in the socket.

4.) Plug the service dongle on the usb port on rear panel.

5.) Turn on the system.

6.) When the log in dialog box appears, type the service password for maintenance mode.

7.) If the win XP screen appear, run the window explorer. Move the cursor to bottom of the screen.

8.) If the task bas appear, click the explorer icon.

8-6-2-7 How to Check and write the system serial number on EEPROM (cont'd)

Figure 8-77 Window Explorer on OS screen

9.) Run the "PC2IPIIC.EXE" by double click . This execution file is in "C:\Jupiter\target\bin" directory

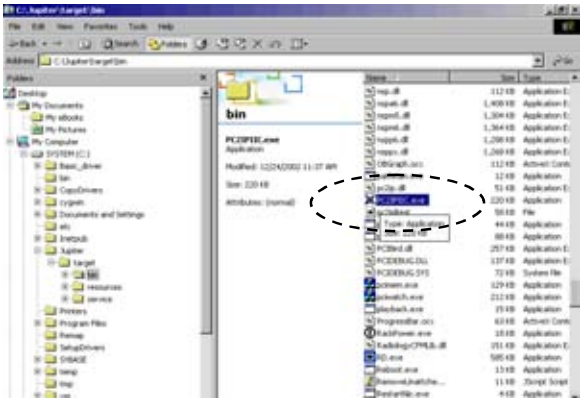


Figure 8-78 "PC2IPIIC.EXE"

10.) Write the serial number in eeprom
11.) If double click the "PC2IPIIC.EXE", this dialog box will be appeared.
12.) Move the trackball cursor on the white blank box and click the set key.
13.) Type the system serial number in the box.
14.) And move the trackball cursor on to "Write" button and click the set key.

8-6-2-7 How to Check and write the system serial number on EEPROM (cont'd)

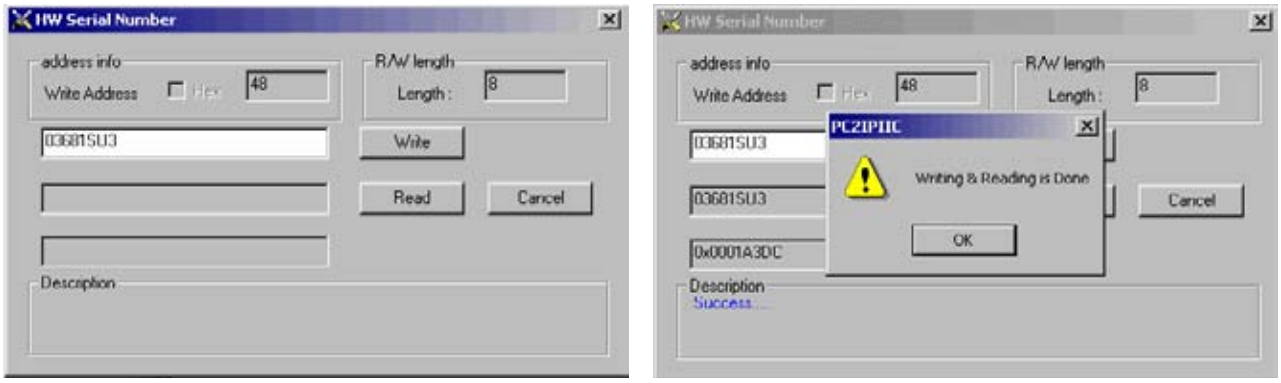


Figure 8-79 Execute the "PC2IPIIC.EXE"

15.) If the same serial number appear on the next column as below picture, the write procedure is finished.

8-6-3 Gas Spring Assy

Purpose: This is a description on how to remove and replace the Up/Down Assy.

8-6-3-1 Tools

- Common pillips screwdrivers
- Allen/Unbraco wrench
- E-ring gripper

8-6-3-2 Needed Manpower

- 1 person, 45 minutes + travel

8-6-3-3 Preparations

- Shut Down the System and switch off the Main Breaker at the rear as described in section 4-3-2 on page 3.
- Removal of following parts should be proceeded before start.
- Remove CRT Assy, KeyBoard Assy, Probe Holder,Left Cover, Right Cover, Front Base Cover, Front Cover, OP Side L Cover, OP Side R Cover, OP Rear Cover, EMI Cover L, EMI Cover R, BackPlane, and BEP (Back End Processor) ASSY.

8-6-3-4 Removal Procedure

1.) Lower the OP Frame down to its lowest position. Refer to Figure 8-80.

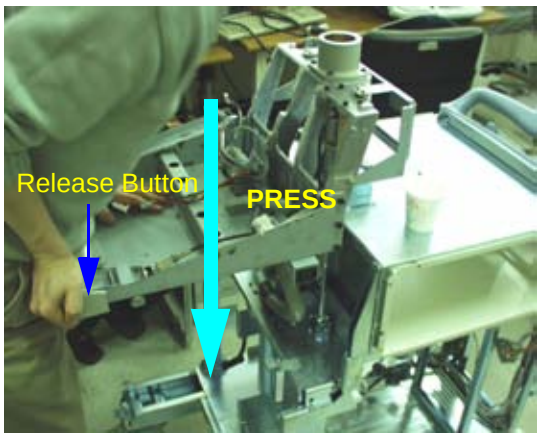


Figure 8-80 Lowering the OP Frame

2.) Unscrew three (3) screws (1-3) to remove the OP push button.

8-6-3-4 Removal Procedure (cont'd)

3.) Unscrew two (3) screws (4-6) to remove the OP button bracket. Refer to Figure 8-81.

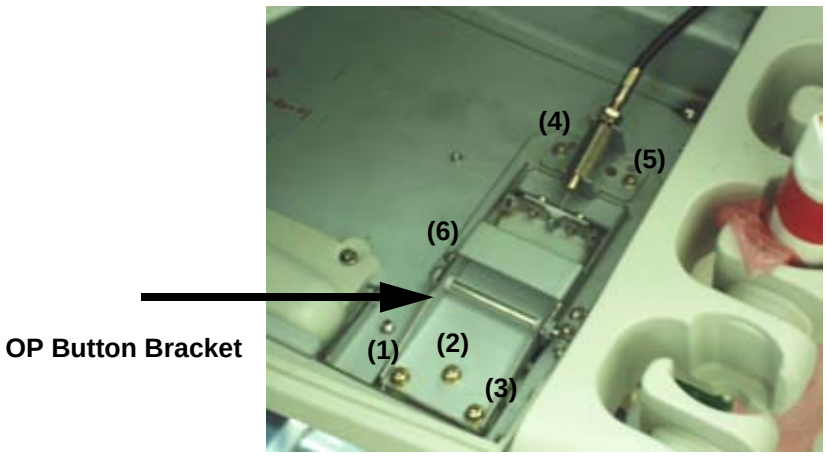


Figure 8-81 Unscrew 6 screws to remove BRKT

4.) Unscrew four (4) hexagon screws (7-10). Refer to Figure 8-82.

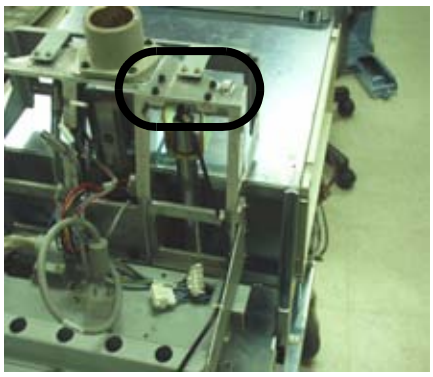


Figure 8-82 Unscrew 4 hexagon screws

5.) Using E-ring gripper, remove E-ring. Refer to Figure 8-83.

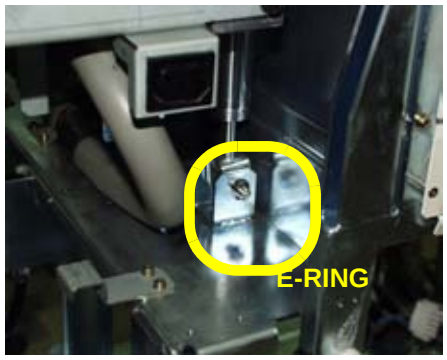


Figure 8-83 Remove E-Ring

6.) Pull the Gas-spring out upward.

8-6-3-4 Removal Procedure (cont'd)

7.) Perform the following functional tests. If all are successful, include the debrief script provided below.

Table 8-38 Functional Tests

Service Manual Section	Functional Test / Diagnostic Test	Debrief Script
Section 4-3-1	Power On/Boot Up	"Service Manual, Direction 2300000, Rev 1+, Section 8-6-3. Equipment passed all required tests and is ready for use. "
Section 4-3-2	Power Off / Shutdown	
Section 4-8-2-4	Gas Spring Assy	
Section 10-5-5	Physical Inspection	

8-6-3-5 Mounting procedure

Install the new parts in the reverse order of removal.

8-6-4 Front Caster

Purpose: This is a description on how to remove and replace the Front Caster.

8-6-4-1 Tools

- Common pillips screwdrivers
- Allen/Unbraco wrench
- Lifter (180Kg)

8-6-4-2 Needed Manpower

- 1 persons, 15 minutes + travel

8-6-4-3 Preparations

- Shut Down the System and switch off the Main Breaker at the rear as described in section 4-3-2 on page 3.
- Lift the system before proceed.

8-6-4-4 Removal Procedure

1.) Unscrew eight (8) hexagonal bolts (1-8).

2.) Remove the Front Caster. Refer to Figure 8-84.

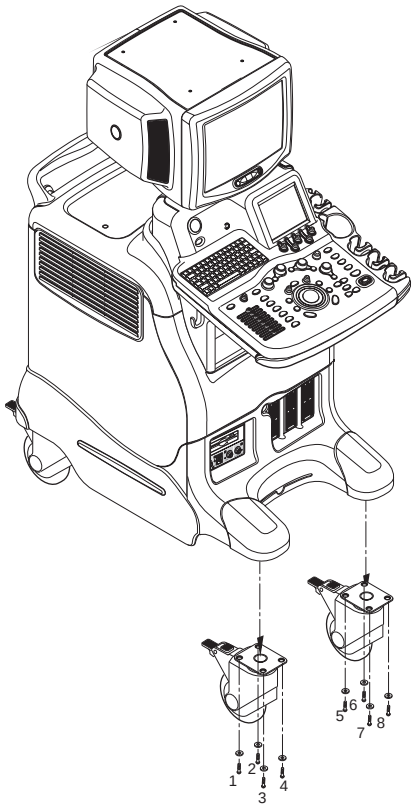


Figure 8-84 Removing the Front Caster

8-6-4-4 Removal Procedure (cont'd)

3.) Perform the following functional tests. If all are successful, include the debrief script provided below.

Table 8-39 Functional Tests

Service Manual Section	Functional Test / Diagnostic Test	Debrief Script
Section 4-3-1	Power On/Boot Up	"Service Manual, Direction 2300000, Rev 1+, Section 8-6-4. Equipment passed all required tests and is ready for use. "
Section 4-3-2	Power Off / Shutdown	
Section 4-8-2-5	Front caster/Rear caster	
Section 10-5-5	Physical Inspection	

8-6-4-5 Mounting procedure

Install the new parts in the reverse order of removal.

8-6-5 Rear Caster

Purpose: This is a description on how to remove and replace the Rear Caster.

8-6-5-1 Tools

- Common pillips screwdrivers
- Allen/Unbraco wrench
- Lifter (180Kg)

8-6-5-2 Needed Manpower

- 1 person, 15 minutes + travel

8-6-5-3 Preparations

- Shut Down the System and switch off the Main Breaker at the rear as described in section 4-3-2 on page 3.
- Lift the system before proceed.

8-6-5-4 Removal Procedure

1.) Unscrew eight hexagonal bolts (1-8).

2.) Remove the Rear Caster. Refer to Figure 8-85.

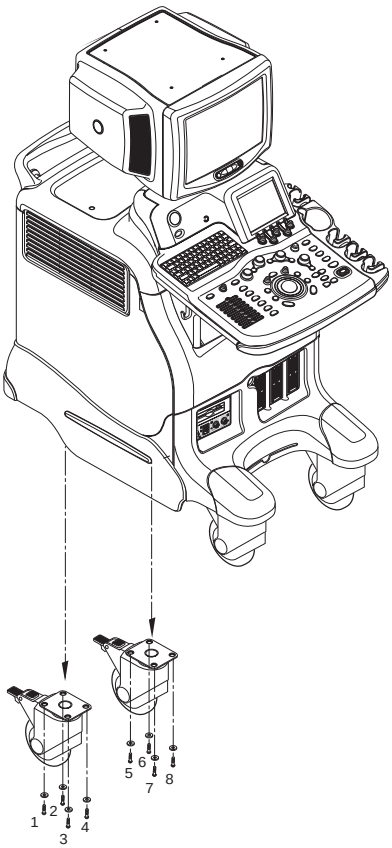


Figure 8-85 Removing the Rear Caster

8-6-5-4 Removal Procedure (cont'd)

3.) Perform the following functional tests. If all are successful, include the debrief script provided below.

Table 8-40 Functional Tests

Service Manual Section	Functional Test / Diagnostic Test	Debrief Script
Section 4-3-1	Power On/Boot Up	"Service Manual, Direction 2300000, Rev 1+, Section 8-6-5. Equipment passed all required tests and is ready for use. "
Section 4-3-2	Power Off / Shutdown	
Section 4-8-2-5	Front caster/Rear caster	
Section 10-5-5	Physical Inspection	

8-6-5-5 Mounting procedure

Install the new parts in the reverse order of removal.

8-6-6 Bumper Set

Purpose: This is a description on how to remove and replace the Bumper Set.

8-6-6-1 Tools

- Common pillips screwdrivers

8-6-6-2 Needed Manpower

- 1persons, 20 minutes + travel

8-6-6-3 Preparations

- Shut Down the System and switch off the Main Breaker at the rear as described in section 4-3-2 on page 3.

8-6-6-4 Removal Procedure

1.) Remove the Monitor Assy. Refer to section 8-3-1 on page 2.
2.) Remove the Left Cover. Refer to section 8-5-1 on page 39.
3.) Remove the Right Cover. Refer to section 8-5-2 on page 41.
4.) Remove the Front Base Cover. Refer to section 8-5-6 on page 49.
5.) Unscrew two screws (1-2).
6.) Remove the Bumper Set. Refer to Figure 8-86.

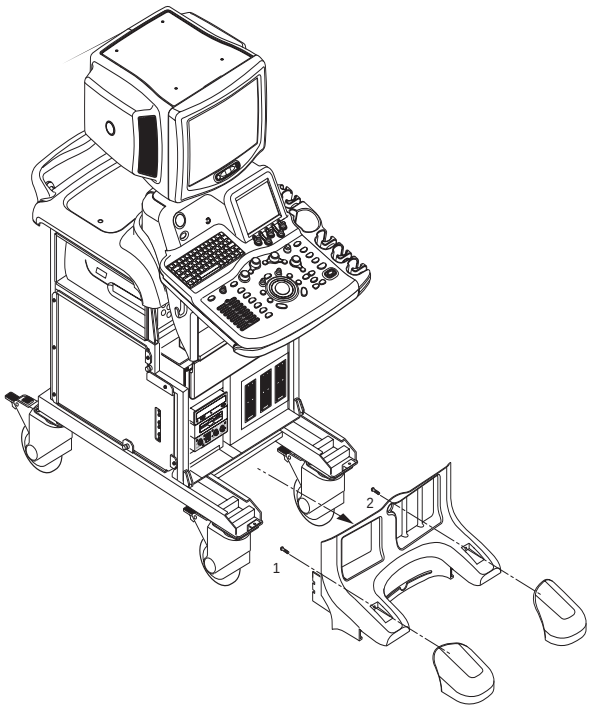


Figure 8-86 Removing the Bumper Set

8-6-6-4 Removal Procedure (cont'd)

7.) Perform the following functional tests. If all are successful, include the debrief script provided below.

Table 8-41 Functional Tests

Service Manual Section	Functional Test / Diagnostic Test	Debrief Script
Section 4-3-1	Power On/Boot Up	"Service Manual, Direction 2300000, Rev 1+, Section 8-6-6. Equipment passed all required tests and is ready for use. "
Section 4-3-2	Power Off / Shutdown	
Section 4-8-2-6	Bumper Set	
Section 10-5-5	Physical Inspection	

8-6-6-5 Mounting procedure

Install the new parts in the reverse order of removal.

8-6-7 Air Filter Set

Purpose: This is a description on how to remove and replace the Air Filter Set.

8-6-7-1 Tools

- Not Required.

8-6-7-2 Needed Manpower

- 1 person, 5 minutes + travel

8-6-7-3 Preparations

- Shut Down the System and switch off the Main Breaker at the rear as described in section 4-3-2 on page 3.

8-6-7-4 Removal Procedure

1.) Remove Air Filter as illustrated below.Refer to Figure 8-87.

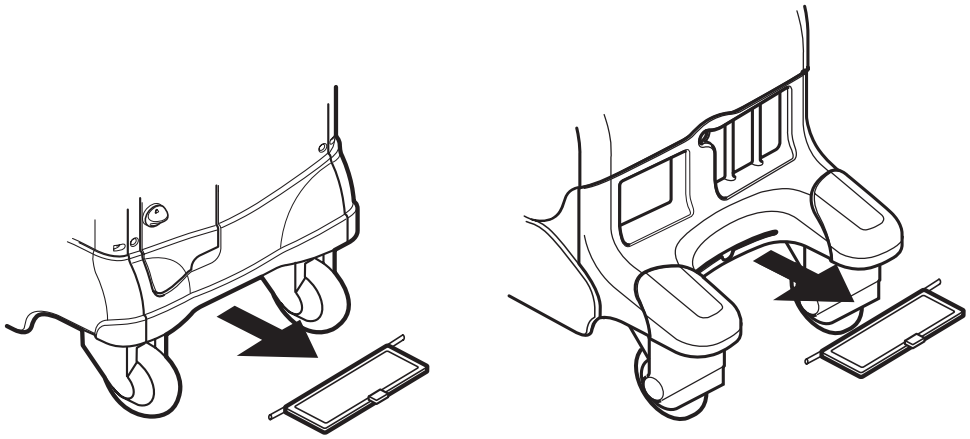


Figure 8-87 Removing the Air Filters

2.) Perform the following functional tests. If all are successful, include the debrief script provided below.

Table 8-42 Functional Tests

Service Manual Section	Functional Test / Diagnostic Test	Debrief Script
Section 4-3-1	Power On/Boot Up	"Service Manual, Direction 2300000, Rev 1+, Section 8-6-7. Equipment passed all required tests and is ready for use. "
Section 4-3-2	Power Off / Shutdown	
Section 4-8-2-7	Air filter set	
Section 10-5-5	Physical Inspection	

8-6-7-5 Mounting procedure

Install the new parts in the reverse order of removal.

Section 8-7
PCB Boards

8-7-1 RLY Assy

Purpose: This is a description on how to remove and replace the RLY Assy.

8-7-1-1 Tools

- Common pillips screwdrivers

8-7-1-2 Needed Manpower

- 1 person, 15 minutes + travel

8-7-1-3 Preparations

- Shut Down the System and switch off the Main Breaker at the rear as described in section 4-3-2 on page 3.

8-7-1-4 Removal Procedure

CAUTION **An electronic discharge may damage a component. Turn OFF power and wear the wrist strap before you remove circuit boards. Do not unplug the power cord to keep ground continuity.**

Do not bend or flex the boards when mounting/dismounting each boards. Surface mount IC boards are very susceptible to damage from flex/torque.

1.) Remove the Front Cover. Refer to section 8-5-7 on page 51.
2.) Remove the Front Base Cover. Refer to section 8-5-6 on page 49.
3.) Unscrew five (5) screws (1-5) to remove the EMC Bracket. Refer to Figure 8-88.

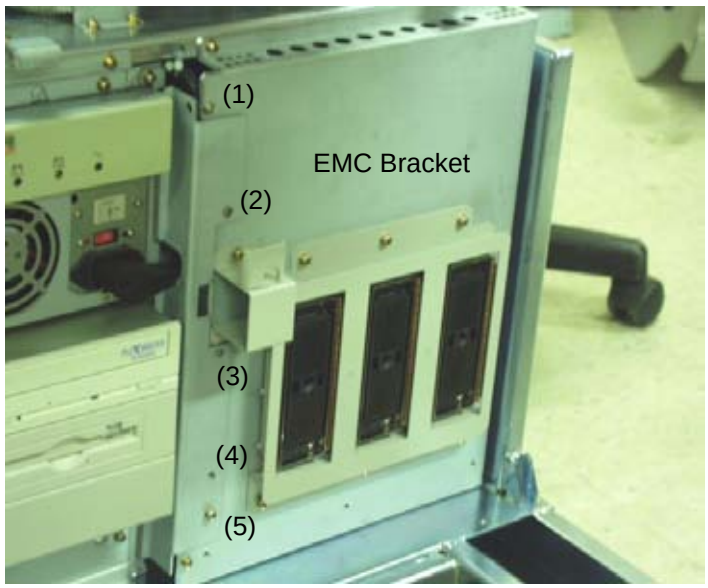


Figure 8-88 Unscrew 5 screws to remove EMC BRKT

8-7-1-4 Removal Procedure (cont'd)

4.) Unscrew nine (9) screws (6-14) to remove the RLY Board Cover. Refer to Figure 8-89.

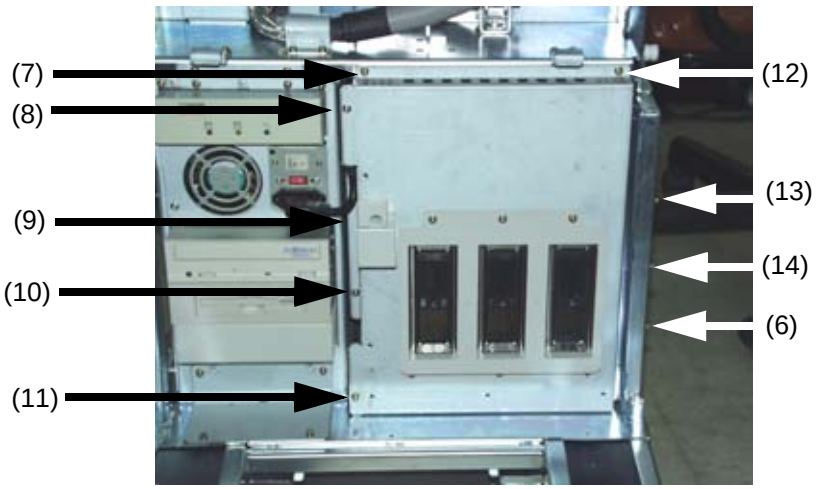


Figure 8-89 Removing the RLY board Cover

NOTE: Bind head screw is used at the location number (8).

5.) Unscrew seven (7) screws (15-21) to remove the RLY Board. Refer to Figure 8-90.

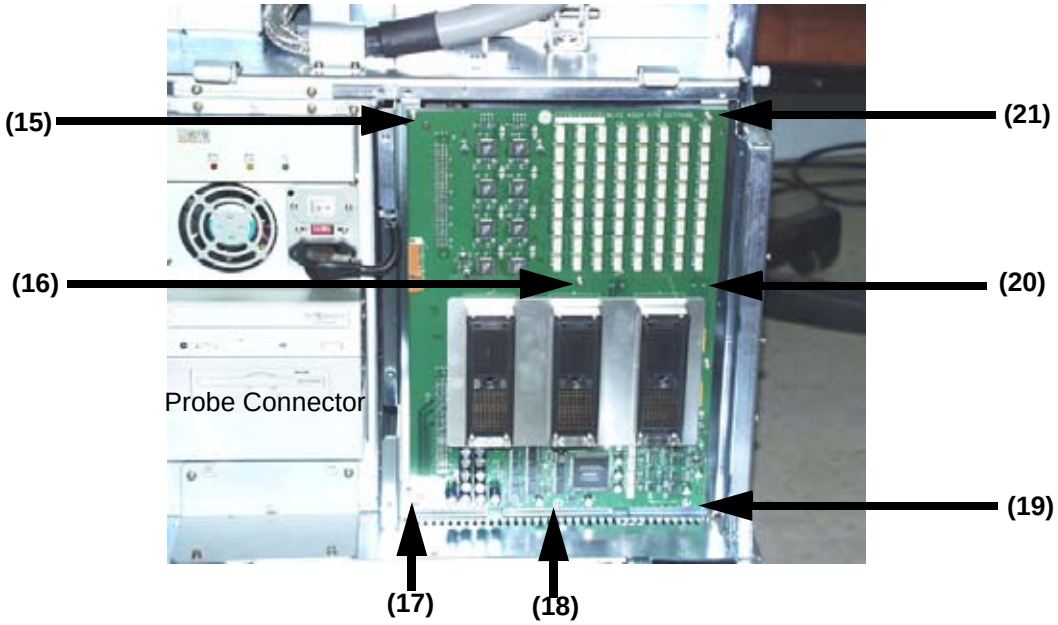


Figure 8-90 Unscrew 7 screws to remove the RLY Board

6.) Get the probe connector and pull the RLY board Out.

8-7-1-4 Removal Procedure (cont'd)

7.) Perform the following functional tests. If all are successful, include the debrief script provided below.

Table 8-43 Functional Tests

Service Manual Section	Functional Test / Diagnostic Test	Debrief Script
Section 4-3-1	Power On/Boot Up	"Service Manual, Direction 2300000, Rev 1+, Section 8-7-1. Equipment passed all required tests and is ready for use. "
Section 4-3-2	Power Off / Shutdown	
Section 4-9-1	RLY Assy function check procedure	
Section 4-3-4	System B/M-Mode Checks	
Section 4-3-5	System CFM and PWD Checks	
Section 10-5-2	Functional Checks (See Also Chapter 4)	
Section 10-6	Using a Phantom	

8-7-1-5 Mounting Procedure

Install the new parts in the reverse order of removal.

8-7-2 LMT Assy

Purpose: This is a description on how to remove and replace the LMT Assy.

8-7-2-1 Tools

- Common pillips screwdrivers

8-7-2-2 Needed Manpower

- 1 person, 25 minutes + travel

8-7-2-3 Preparations

- Shut Down the System and switch off the Main Breaker at the rear as described in section 4-3-2 on page 3.

8-7-2-4 Removal Procedure

CAUTION **An electronic discharge may damage a component. Turn OFF power and wear the wrist strap before you remove circuit boards. Do not unplug the power cord to keep ground continuity.**

Do not bend or flex the boards when mounting/dismounting each boards. Surface mount IC boards are very susceptible to damage from flex/torque.

1.) Remove the RLY Assy. Refer to section section 8-7-1 on page 89.
2.) Unscrew two (2) screws (1-2) to remove the LMT Board. Refer to Figure 8-91.

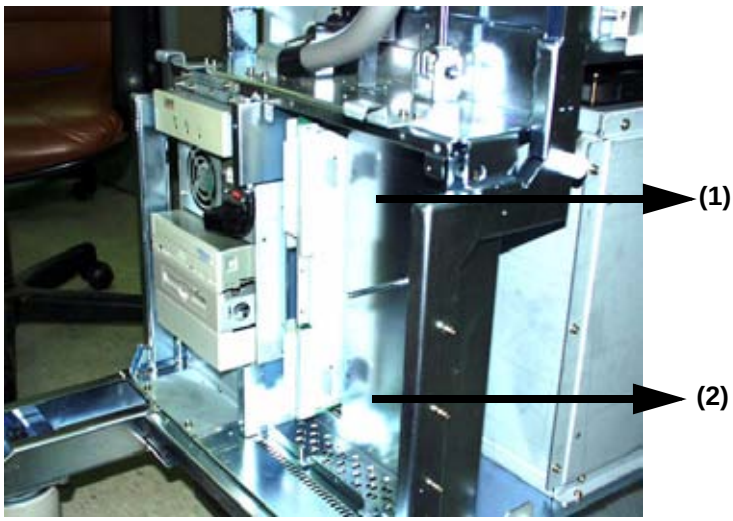


Figure 8-91 Unscrew 2 screws to remove the LMT B'd

8-7-2-4 Removal Procedure (cont'd)

3.) Pull the LMT Board out. Refer to Figure 8-92.

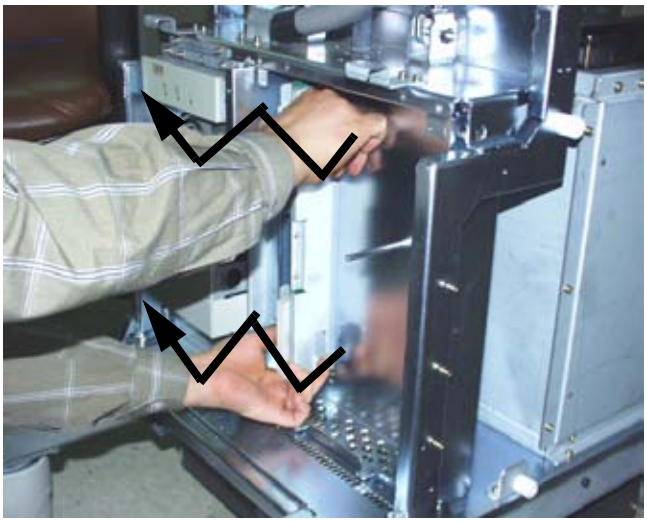


Figure 8-92 Pulling Out LMT Board

4.) Perform the following functional tests. If all are successful, include the debrief script provided below.

Table 8-44 Functional Tests

Service Manual Section	Functional Test / Diagnostic Test	Debrief Script
Section 4-3-1	Power On/Boot Up	"Service Manual, Direction 2300000, Rev 1+, Section 8-7-2. Equipment passed all required tests and is ready for use. "
Section 4-3-2	Power Off / Shutdown	
Section 4-9-2	LMT Assy function check procedure	
Section 4-3-4	System B/M-Mode Checks	
Section 4-3-5	System CFM and PWD Checks	
Section 10-5-2	Functional Checks (See Also Chapter 4)	
Section 10-6	Using a Phantom	

8-7-2-5 Mounting Procedure

Install the new parts in the reverse order of removal.

8-7-3 BackPlane

Purpose: This is a description on how to remove and replace the Backplane.

8-7-3-1 Tools

- Common pillips screwdrivers

8-7-3-2 Needed Manpower

- 1 person, 30 minutes + travel

8-7-3-3 Preparations

- Shut Down the System and switch off the Main Breaker at the rear as described in section 4-3-2 on page 3.
- Left Cover, Right Cover and Rear Cover should be removed before proceed. Refer to section 8-5-1 on page 39, section 8-5-2 on page 41, and section 8-5-3 on page 43.
- It is recommended to remove BEP (Back End Processor) assy before proceed. For more information refer to BEP (Back End Processor) ASSY on section 8-8-1 on page 101.

8-7-3-4 Removal Procedure

CAUTION **An electronic discharge may damage a component. Turn OFF power and wear the wrist strap before you remove circuit boards. Do not unplug the power cord to keep ground continuity.**

Do not bend or flex the boards when mounting/dismounting each boards. Surface mount IC boards are very susceptible to damage from flex/torque.

1.) Remove the EMI Cover R. Refer to section 8-5-14 on page 64.
2.) Unscrew the five screws from the Nest EMI Cover.
3.) Remove the Nest EMI Cover.
4.) From the left view, disconnect eight connectors from the Backplane Assy. Refer to Figure 8-93.

Figure 8-93 Disconnect 8 connectors from the left

8-7-3-4 Removal Procedure (cont'd)

5.) From the right view, disconnect two connectors (9-10).

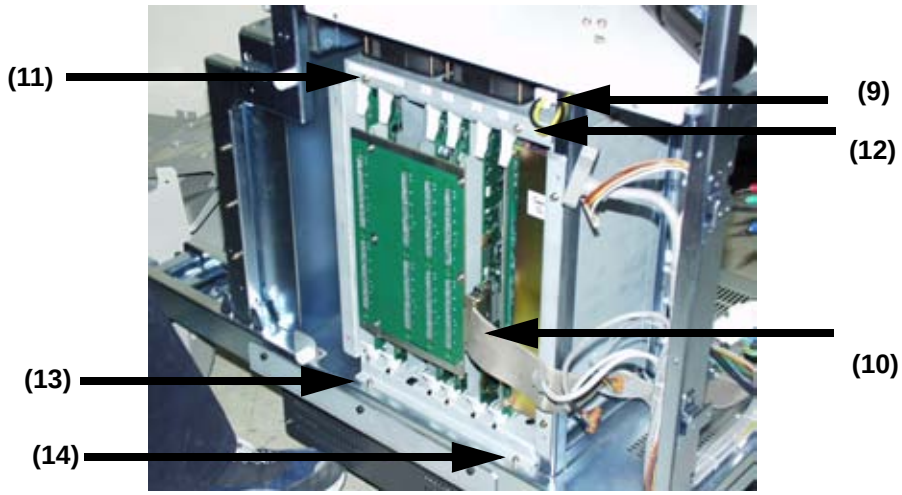


Figure 8-94 Disconnect 2 connectors from the right

6.) Unscrew four (4) screws (11-14) to remove the Backplane Assy.

7.) Pull the Backplane assy out carefully.

⚠ **WARNING** ***The weight of the Backplane with PCBs inside is approximately 20 kg. Two person is needed in the next step.***

8.) Perform the following functional tests. If all are successful, include the debrief script provided below.

Table 8-45 Functional Tests

Service Manual Section	Functional Test / Diagnostic Test	Debrief Script
Section 4-3-1	Power On/Boot Up	"Service Manual, Direction 2300000, Rev 1+, Section 8-7-3. Equipment passed all required tests and is ready for use. "
Section 4-3-2	Power Off / Shutdown	
Section 4-9-8	Backplane Assy function check procedure	
Section 4-3-4	System B/M-Mode Checks	
Section 4-3-5	System CFM and PWD Checks	
Section 10-5-2	Functional Checks (See Also Chapter 4)	
Section 10-6	Using a Phantom	

8-7-3-5 Mounting Procedure

Install the new parts in the reverse order of removal.

8-7-4 PCB Boards

Purpose: This is a description on how to remove and replace the PCB Boards.

PMP Assy, SIG Assy, FEC Assy, RDS Assy, CWDOP Assy, ATD Assy, HV Assy and VIC Card.

8-7-4-1 Tools

- Common pillips screwdrivers
- Allen/Unbraco wrench

8-7-4-2 Needed Manpower

- 1 persons, 20 minutes + travel.

8-7-4-3 Preparations

- Shut Down the System and switch off the Main Breaker at the rear as described in section 4-3-2 on page 3.

8-7-4-4 Removal Procedure

CAUTION **An electronic discharge may damage a component. Turn OFF power and wear the wrist strap before you remove circuit boards. Do not unplug the power cord to keep ground continuity.**

Do not bend or flex the boards when mounting/dismounting each boards. Surface mount IC boards are very susceptible to damage from flex/torque.

1.) Remove the Right Cover. Refer to section 8-5-2 on page 41.
2.) Remove the EMI Cover R. Refer to section 8-5-14 on page 64.
3.) Unscrew the five screws from the Nest EMI Cover.
4.) Remove the Nest EMI Cover.
5.) SIG Assy should be removed first before removing PMP, ATD, CWDOP, RDS Assy.

8-7-4-4 Removal Procedure (cont'd)

6.) Disconnect one connector (1) if removing the FEC Assy. Otherwise skip this step. Refer to Figure 8-95.

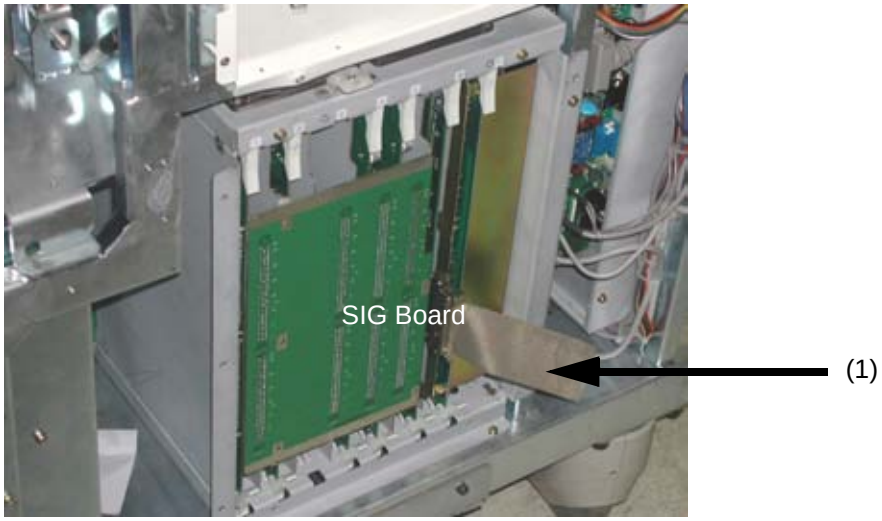


Figure 8-95 Disconnecting Cable

7.) Move the upper and lower stopper in the direction indicated by the arrow (1). Refer to Figure 8-96.

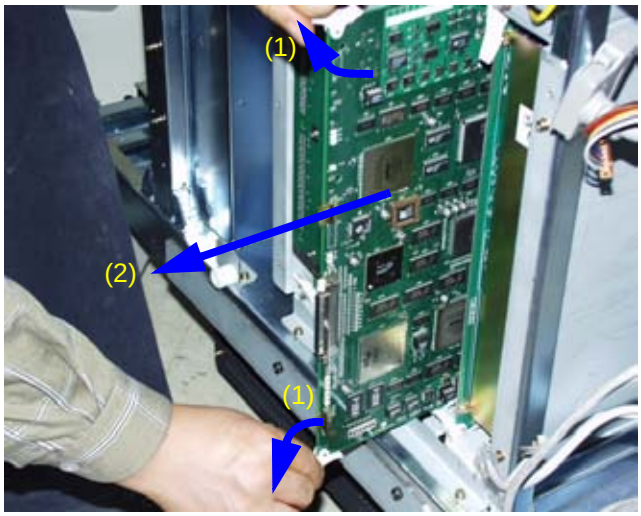


Figure 8-96 Pulling Out the Board.

8.) Pull out the board in the direction indicated by the arrow (2). do not bend it.

8-7-4-4 Removal Procedure (cont'd)

9.) Perform the following functional tests. If all are successful, include the debrief script provided below.

Table 8-46 Functional Tests

Service Manual Section	Functional Test / Diagnostic Test	Debrief Script
Section 4-3-1	Power On/Boot Up	"Service Manual, Direction 2300000, Rev 1+, Section 8-7-4. Equipment passed all required tests and is ready for use. "
Section 4-3-2	Power Off / Shutdown	
Section 4-9	Board Function Checks	
Section 4-3-4	System B/M-Mode Checks	
Section 4-3-5	System CFM and PWD Checks	
Section 10-5-2	Functional Checks (See Also Chapter 4)	
Section 10-6	Using a Phantom	

8-7-4-5 Mounting Procedure

Install the new parts in the reverse order of removal.

8-7-5 DC Fan Assy

Purpose: This is a description on how to remove and replace the DC Fan.

8-7-5-1 Tools

- Common pillips screwdrivers

8-7-5-2 Needed Manpower

- 1 persons, 20 minutes + travel

8-7-5-3 Preparations

- Shut Down the System and switch off the Main Breaker at the rear as described in section 4-3-2 on page 3.

8-7-5-4 Removal Procedure

CAUTION **An electronic discharge may damage a component. Turn OFF power and wear the wrist strap before you remove circuit boards. Do not unplug the power cord to keep ground continuity.**

Do not bend or flex the boards when mounting/dismounting each boards. Surface mount IC boards are very susceptible to damage from flex/torque.

1.) Remove the Right Cover. Refer to section 8-5-2 on page 41.
2.) Remove the EMI Cover R. Refer to section 8-5-14 on page 64.
3.) Unscrew the five screws from the Nest EMI Cover.
4.) Remove the Nest EMI Cover.
5.) Disconnect one (1) connector (1).
6.) Unscrew two (2) screws (2-3) to remove DC Fan Assy.

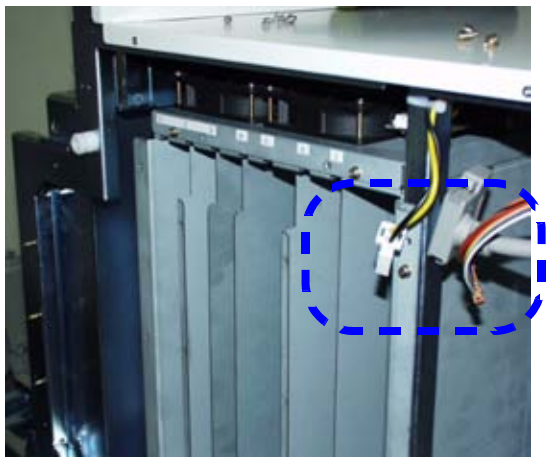


Figure 8-97 Removing the DC Fan Assy

8-7-5-4 Removal Procedure (cont'd)

7.) Perform the following functional tests. If all are successful, include the debrief script provided below.

Table 8-47 Functional Tests

Service Manual Section	Functional Test / Diagnostic Test	Debrief Script
Section 4-3-1	Power On/Boot Up	"Service Manual, Direction 2300000, Rev 1+, Section 8-7-5. Equipment passed all required tests and is ready for use. "
Section 4-3-2	Power Off / Shutdown	

8-7-5-5 Mounting Procedure

Install the new parts in the reverse order of removal.

Section 8-8
PC Block

8-8-1 BEP (Back End Processor - BEP1, BEP2, BEP3, BT05 BEP3,BEP4) ASSY

Purpose: This is a description on how to remove and replace the Parts in the BEP, BEP2 and BEP3 Assy.

NOTE: All BEP, BEP2 and BEP3 and commonly named as "BEP" in this procedure.

8-8-1-1 Tools

- Common pillips screwdrivers

8-8-1-2 Needed Manpower

- 2 persons, 15 minutes + travel

8-8-1-3 Preparations

- Shut Down the System and switch off the Main Breaker at the rear as described in section 4-3-2 on page 3.
- Left Cover, Right Cover and Rear Cover should be removed before proceed. Refer to section 8-5-1 on page 39, section 8-5-2 on page 41, and section 8-5-3 on page 43.

8-8-1-4 General Procedures of BEP2 Assy Disassembly

8.) Open the EMI Cover L Assy.

9.) Open the rear cover and EMI Rear Bracket.

10.) Disconnect all the connectors connected With the BEP.

11.) Unscrew eight (8) screws (1-8) and take out the BEP Power plug(9).

12.) Take out the BEP assy to forward direction.

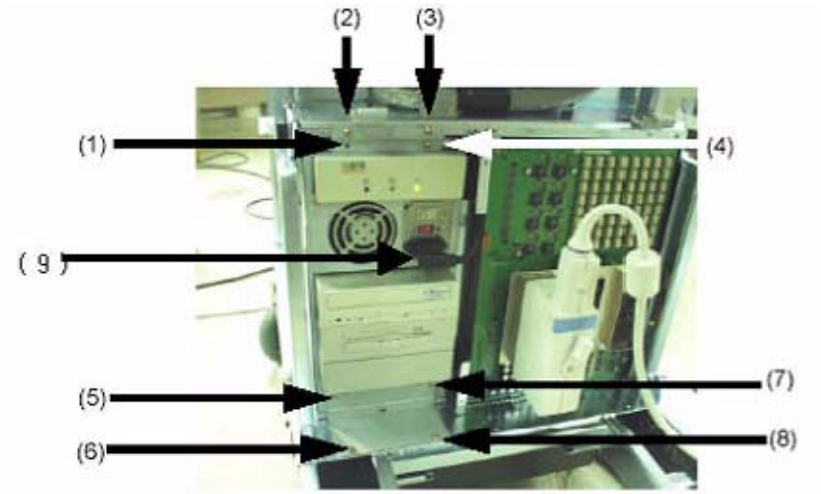


Figure 8-98 Take out the BEP assy from the console

8-8-1-4 General Procedures of BEP2 Assy Disassembly (cont'd)

13.) When replace the BEP assy the option dongle should be moved from old BEP to new one. The FRU BEP doesn't have the option dongle.

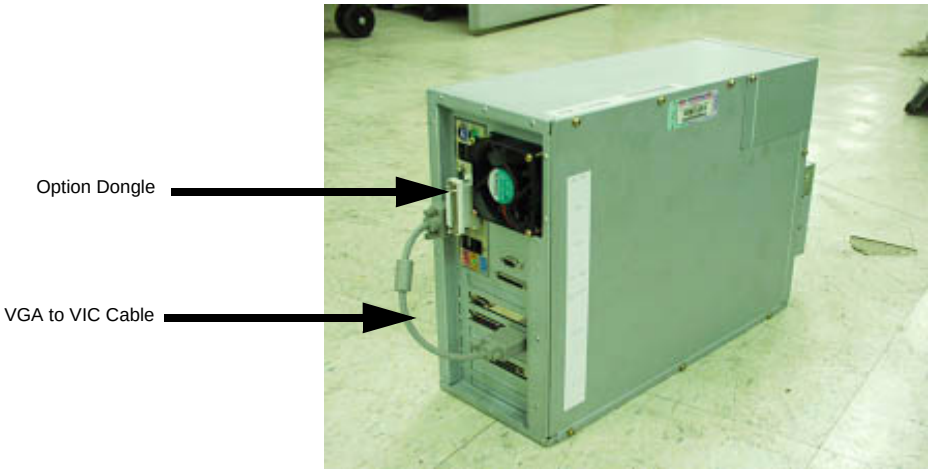


Figure 8-99 Option Dongle replacement

General Procedures of BEP3 Assy Disassembly.

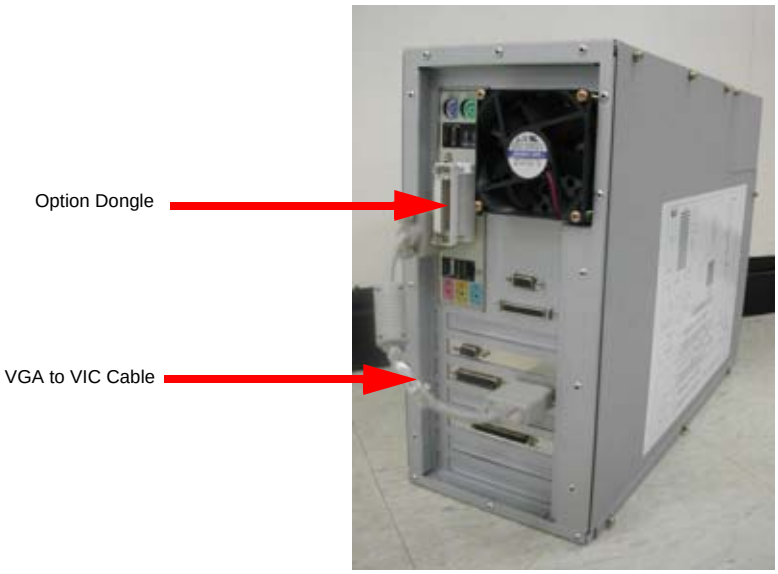


Figure 8-100 BEP3 Option Dongle replacement

8-8-1-4 General Procedures of BEP2 Assy Disassembly (cont'd)

General Procedures of BT05 BEP3 Assy Disassembly

Figure 8-101 BT05 BEP3 Option Dongle replacement

NOTE: BEP2 and BEP3 FUR include applicable FRU CD SET, APPLICATION CD [2.06 Version], VGA VIC CABLE ,which consider BEP1 User

NOTE: BT05 BEP3 FRU include no CD SET, VGA VIC CABLE. Because BT05 BEP3 FRU is interchanged with only BTO5 SYSTEM (Use CD SET of Install Based system)

NOTE: BEP2 and BEP3 FRU can be interchanged with all of Install based system exclude BTO5 SYSTEM, That is to say, BT05 BEP3 FRU can be alternated with only BTO5 Install Based system

NOTE: BEP FRU include CD set and VGA to VIC cable because the CD set and cable for BEP1 can not be used for BEP

NOTE: If the BEP1 is replaced with BEP FRU, the CD set on the EMI metal cover also should be replaced with new CD set which is included in the BEP FRU kits

8-8-1-5 BEP Cable Connection with Console(In case of change BEP 1 into BEP2 or BEP3)

1.) Push the BEP Assy into The System and then Connect PCI Cable.
2.) Check the PCI cable is arranged without short before connecting PCI cable to BEP.
3.) Connect the PCI cable to the BEP assy.

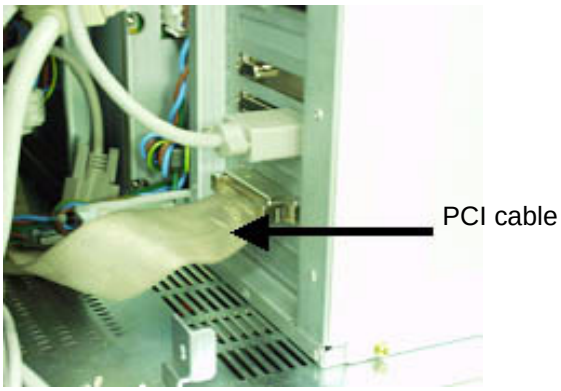


Figure 1-102 PCI cable connection

4.) Connect the J2 Cable connector to the BEP.

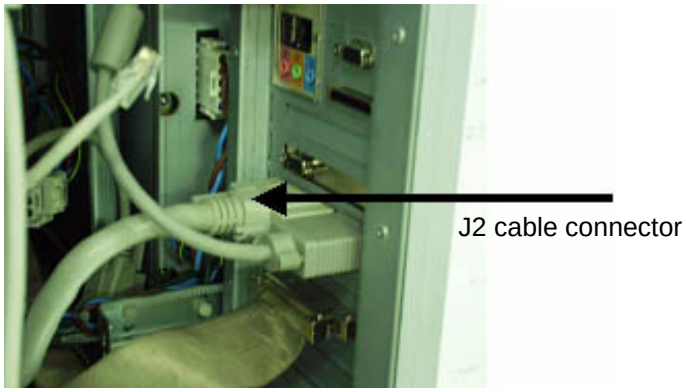


Figure 1-103 J2 cable connection

5.) Connect the LCD Connector to BEP.

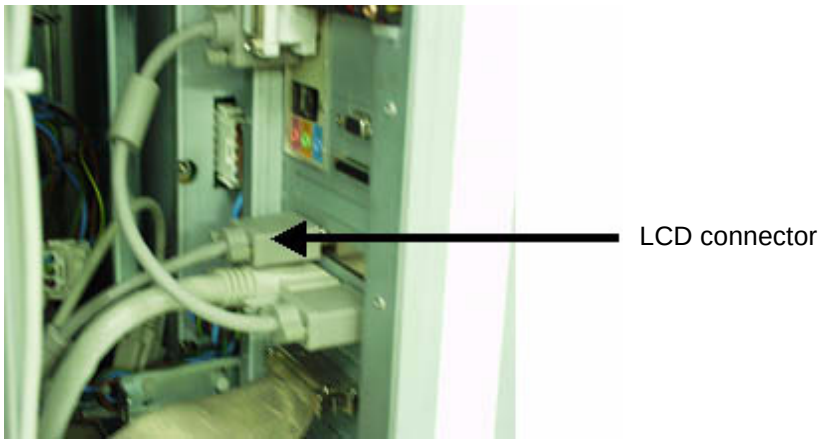


Figure 1-104 LCD cable connection

8-8-1-5 BEP Cable Connection with Console(In case of change BEP 1 into BEP2 or BEP3) (cont'd)

6.) Connect LI, LO, MI, ETHERNET Connector to Sound/LAN Port on BEP.

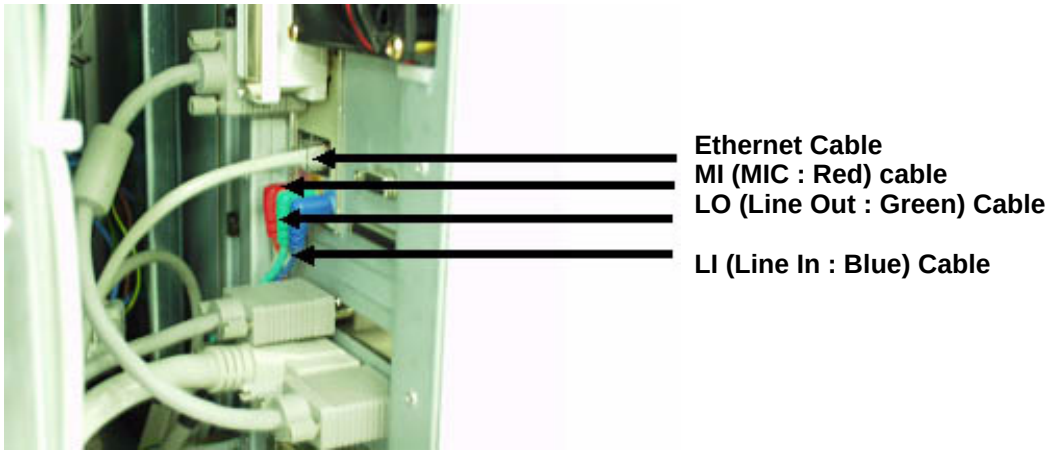


Figure 1-105 Connecting Cables

7.) Connect CON17 Connector to BEP.

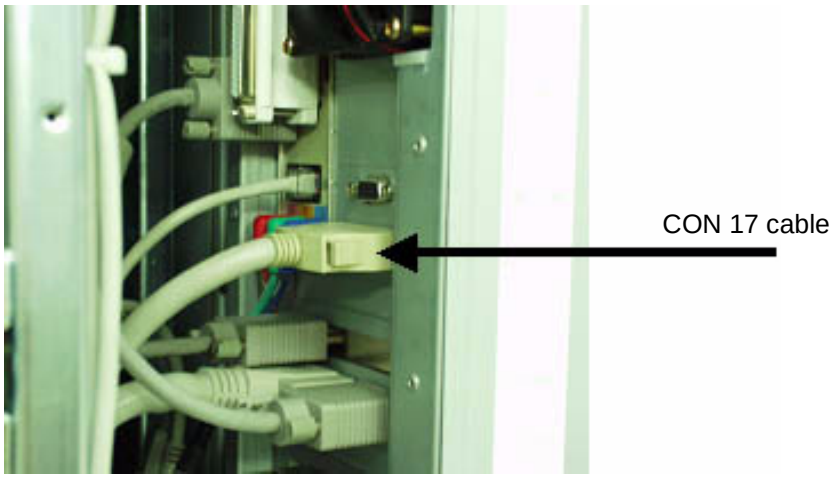


Figure 1-106 Connecting CON17 cables

8.) Check the CON 17 cable is arranged without short before connecting.

8-8-1-5 BEP Cable Connection with Console(In case of change BEP 1 into BEP2 or BEP3) (cont'd)

9.) Connect CON21 Connector to BEP.

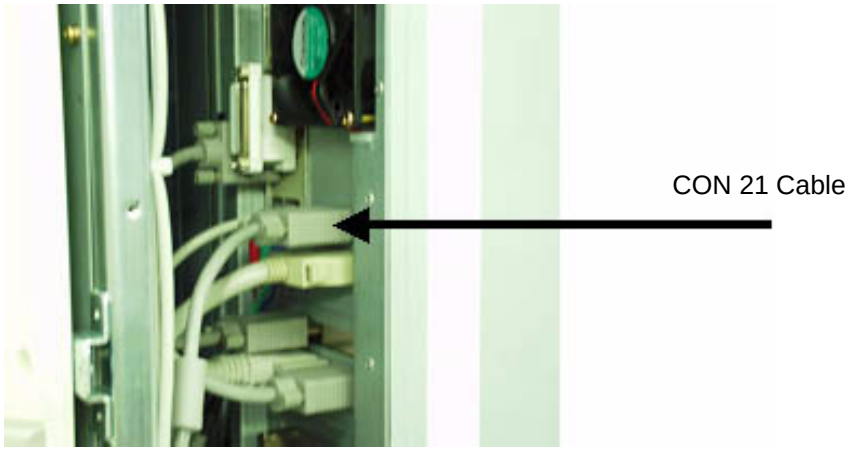


Figure 1-107 CON21 cable connection

10.) Connection COM1 Connector to Serial Port on BEP.

NOTE: COM1 Cable Connect to Motherboard Serial Port (D-SUB 9 Pin Male)

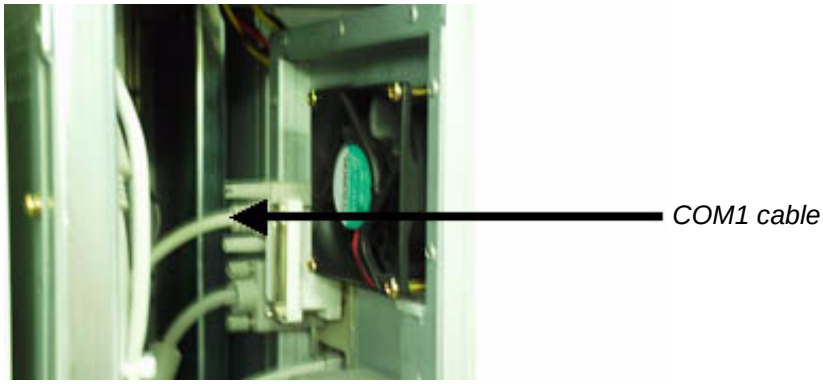


Figure 1-108 COM1 cable connection

8-8-1-5 BEP Cable Connection with Console(In case of change BEP 1 into BEP2 or BEP3) (cont'd)

11.) Connection Keyboard, Printer connector to USB Port on BEP.

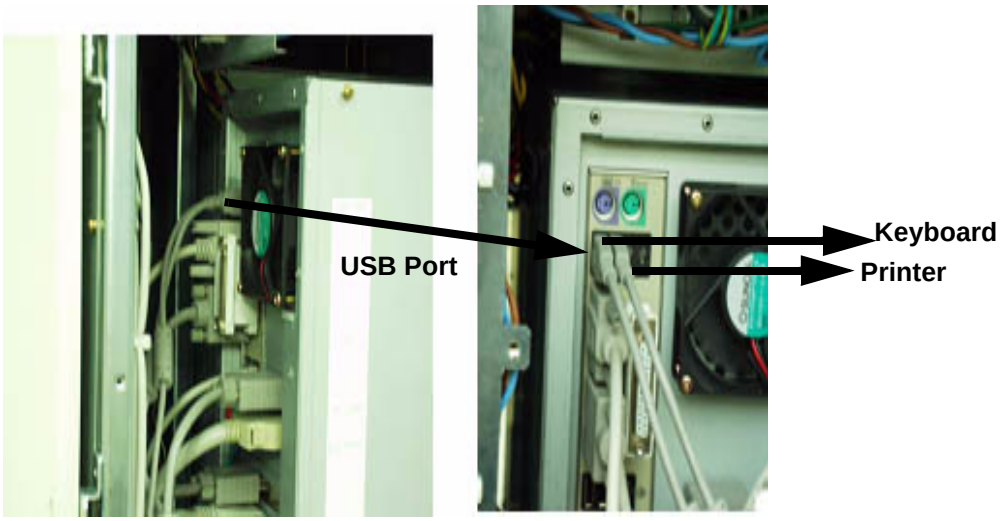


Figure 1-109 Keyboard, Printer connector

12.) Connect ATX Power to BEP.

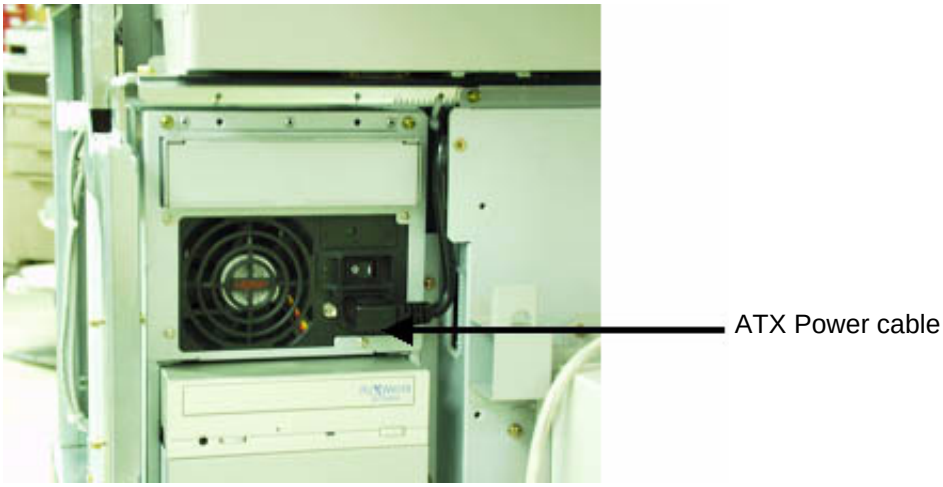


Figure 1-110 ATX Power cable connector

8-8-1-6 BEP Cable Connection With Console (In case of change to BTO5 BEP3 FRU on BTO5 SYSTEM)

1.) Push the BEP Assy into The System and then Connect PCI Cable.
2.) Check the PCI cable is arranged without short before connecting PCI cable to BEP.
3.) Connect the PCI cable to the BEP assy

Figure 8-111 PCI cable connection

4.) Connect the J2 Cable connector to the BEP.

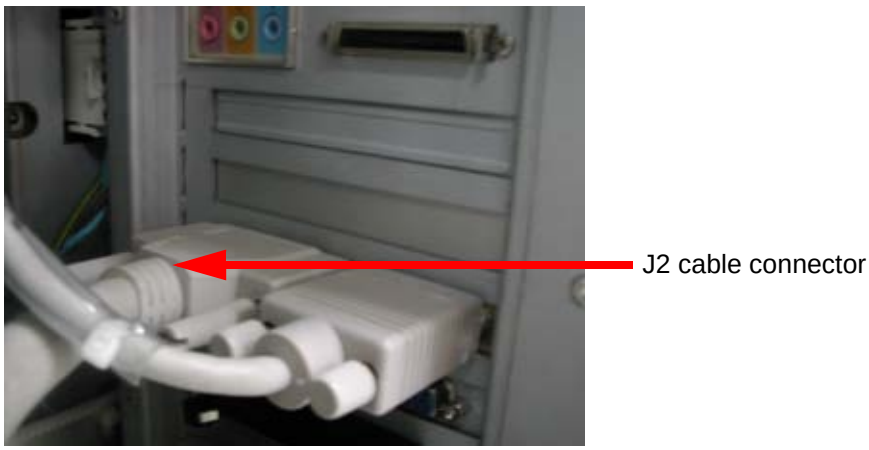


Figure 1-112 J2 cable connection

8-8-1-6 BEP Cable Connection With Console (In case of change to BTO5 BEP3 FRU on BTO5 SYSTEM) (cont'd)

5.) Connect the LCD Connector to BEP.

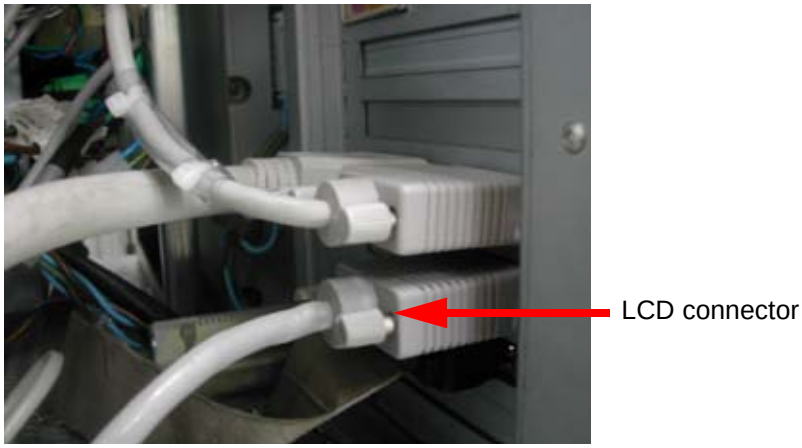


Figure 1-113 LCD cable connection

6.) Connect LI, LO, MI, ETHERNET Connector to Sound/LAN Port on BEP.

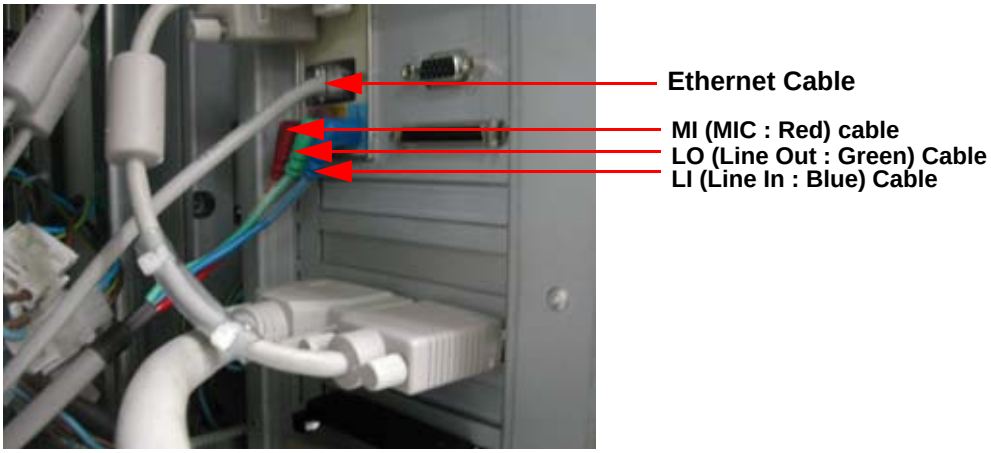


Figure 1-114 Connecting Cables

8-8-1-6 BEP Cable Connection With Console (In case of change to BTO5 BEP3 FRU on BTO5 SYSTEM) (cont'd)

7.) Connect CON17 Connector to BEP.

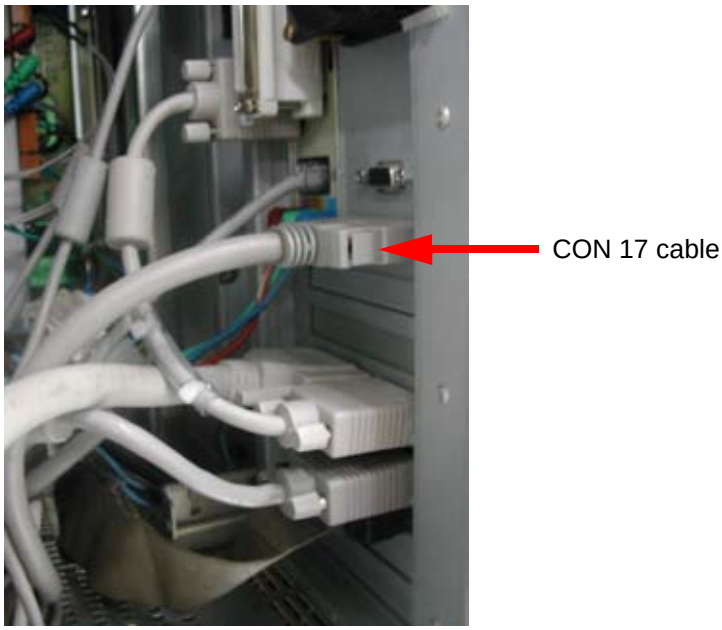


Figure 1-115 Connecting CON17 cables

8.) Check the CON 17 cable is arranged without short before connecting.

9.) Connect CON21 Connector to BEP.

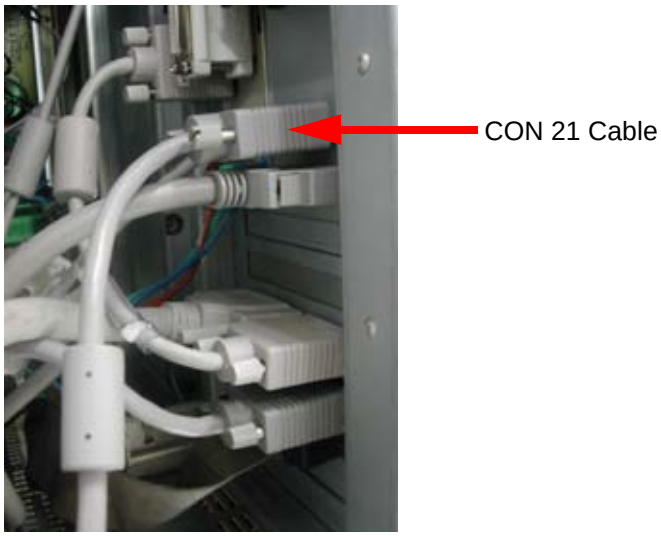


Figure 1-116 CON21 cable connection

8-8-1-6 BEP Cable Connection With Console (In case of change to BTO5 BEP3 FRU on BTO5 SYSTEM) (cont'd)

10.) Connection COM1 Connector to Serial Port on BEP.

NOTE: COM1 Cable Connect to Motherboard Serial Port (D-SUB 9 Pin Male)

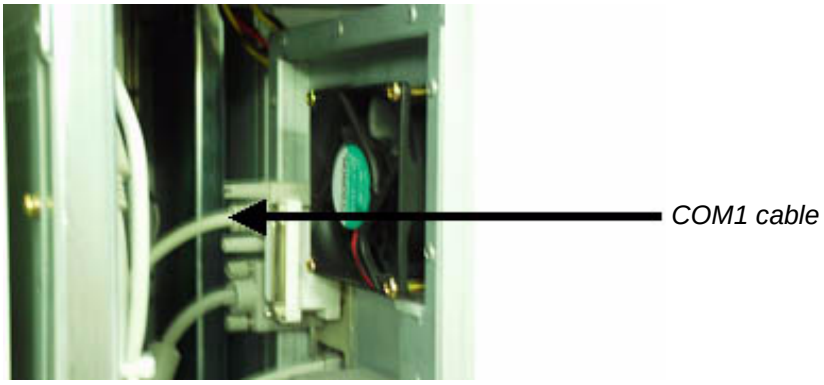


Figure 1-117 COM1 cable connection

11.) Connection Keyboard, Printer connector to USB Port on BEP.

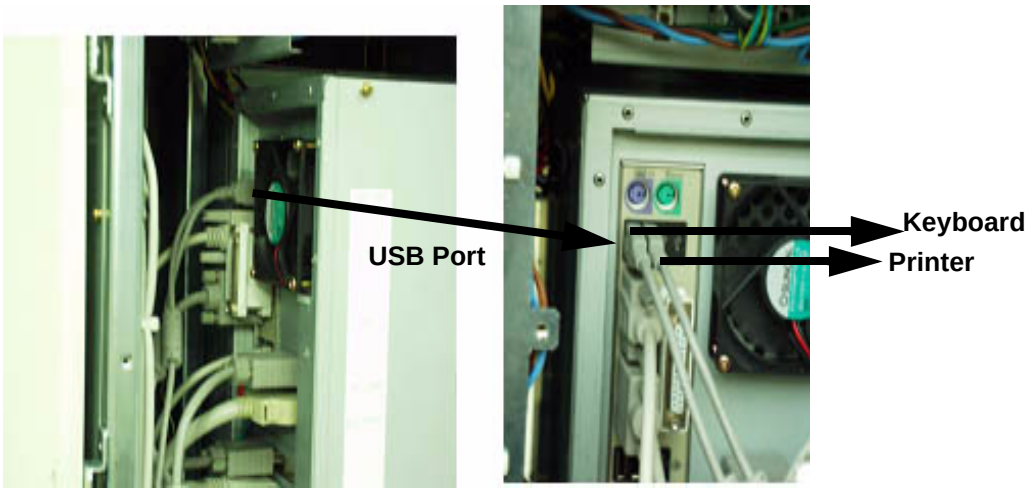


Figure 1-118 Keyboard, Printer connector

8-8-1-6 BEP Cable Connection With Console (In case of change to BTO5 BEP3 FRU on BTO5 SYSTEM) (cont'd)

12.) Connect ATX Power to BEP.

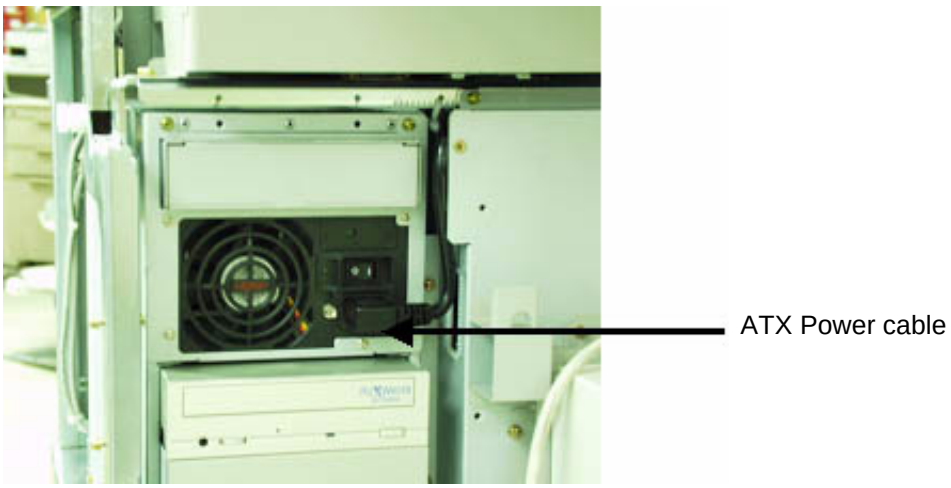


Figure 1-119 ATX Power cable connector

8-8-1-7 System Functional Check (In case of change BEP 1 into BEP2 or BEP3)

Check the system after BEP is assembled on the console.

1.) Pull Up Circuit Breaker.
2.) Insert the Service Key to Rear Panel USB Port.
3.) Power on the system.
4.) Check The Logo Image as below. BEP Logo Image Is differ from that of BEP1.

BEP2 Logo Image **BEP3 Logo Image**

Figure 1-120 Logo Display

5.) Press F2 Key
6.) Check the BEP BIOS set-up is same as below.Password is jupiter (lower case)

a.) BEP2 BIOS set up condition.

Main Menu Screen

BIOS Version	RG84510A.86.A.0024.P1
Process Type	Intel ® Pentium ® 4
Process Speed	2Ghz
System Bus Speed	400Mhz
System Memory Speed	266Mhz
Cache RAM	512KB
Total Memory	511MB
Memory Bank 0	512MB (DDR266)
Memory Bank 1	Not Installed
Language	[English]
System time	[04:22:55] -- Current Time Setting
System Data	[The 03/11/2003] -- Current Date Setting

Figure 8-121 Main Menu Screen

Advanced Menu

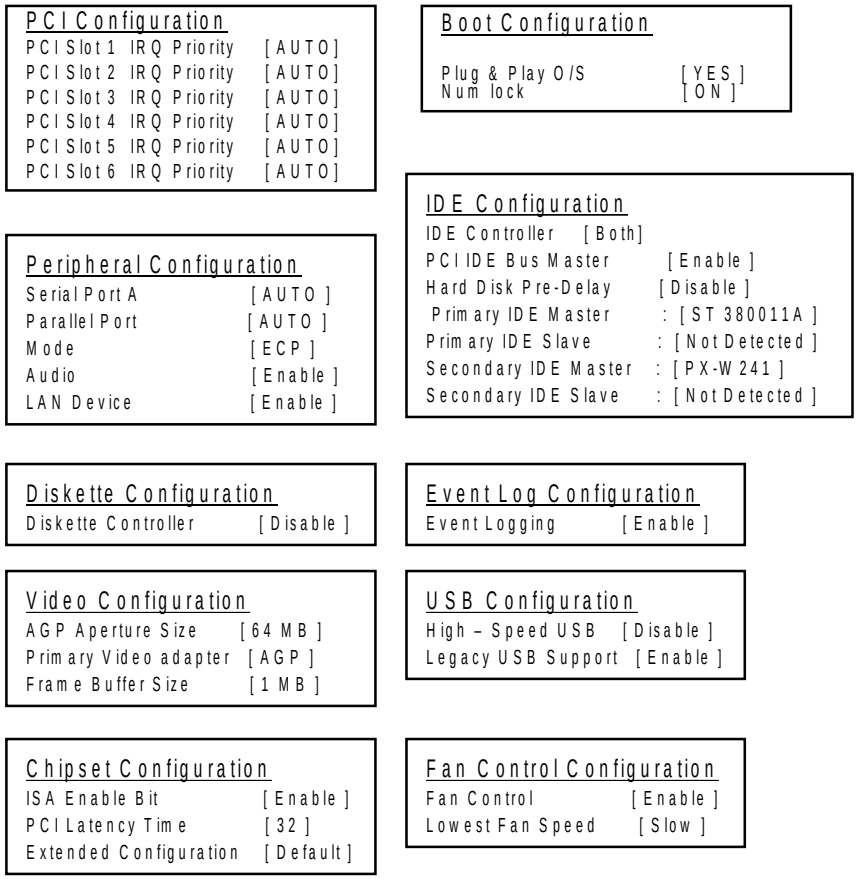


Figure 8-122 Advanced Menu

Security Menu

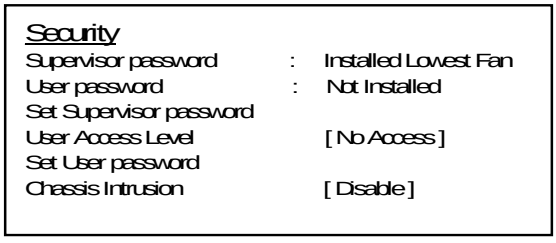


Figure 8-123 Security Menu

Power Menu

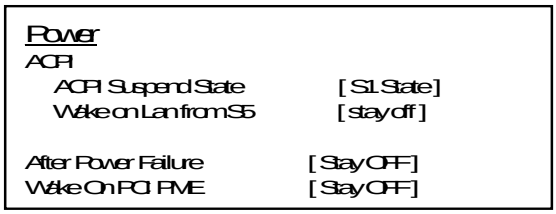


Figure 8-124 Power Menu

Boot Menu

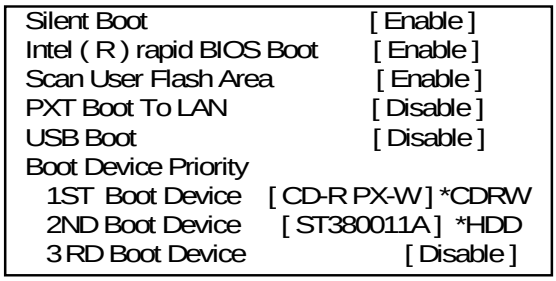

Silent Boot [Enable]
Intel (R) rapid BIOS Boot [Enable]
Scan User Flash Area [Enable]
PXT Boot To LAN [Disable]
USB Boot [Disable]
Boot Device Priority
1ST Boot Device [CD-R PX-W] *CDRW
2ND Boot Device [ST380011A] *HDD
3 RD Boot Device [Disable]

Figure 8-125 Boot Menu

a.) BEP3 BIOS set up condition

Main menu screen

BIOS Version	BF86510A.86.A.0069.P21	
Process Type	Intel Pentium 4	-- Not editable
Process Speed	2.4Ghz	-- Not editable
System Bus Speed	533Mhz	-- Not editable
System Memory Speed	333Mhz	-- Not editable
Cache RAM	512KB	-- Not editable
Total Memory	512MB	-- Not editable
Memory Mode	Single channel	-- Not editable
Memory Channel A Slot 0	512MB (DDR333)	
Memory Channel A Slot 1		-- Not editable
Memory Channel B Slot 0		-- Not editable
Memory Channel B Slot 1		-- Not editable
Language	[English]	
System time	[04:22:55]	-- Current Time Setting
System Data	[The 01 / 3 /2005]	-- Current Date Setting

Advanced menu screen

PCI Configuration

PCI Slot 1 IRQ Priority	[AUTO]	
PCI Slot 2 IRQ Priority	[AUTO]	
PCI Slot 3 IRQ Priority	[AUTO]	
PCI Slot 4 IRQ Priority	[AUTO]	
PCI Slot 5 IRQ Priority	[AUTO]	
PCI Slot 6 IRQ Priority	[AUTO]	

Boot Configuration

Plug & Play O/S	[NO]	
Num lock	[ON]	

Peripheral Configuration

Serial Port A	[AUTO]	
Parallel Port	[AUTO]	
Mode	[ECP]	
Audio	[Enable]	
LAN Device	[Enable]	
ASF Support	[Disabled]	

Device Configuration

ATA/IDE Configuration	[Enhanced]	
PCI IDE Bus Master	[Enhanced]	
Hard Disk Pre-Delay	[Disabled]	
SATA Port-0	[Not detected]	
SATA Port-1	[Not detected]	
PATA Primary Master	[HDS728080PLAT20]	-- Current HDD
PATA Primary Slave	[Not detected]	
PATA Secondary Master	[GCE-8526B]	-- Current CDRW
PATA Secondary Slave	[Optional]	-- Optional MOD

Floppy Configuration

Diskette Controller	[Disabled]	

Event Log Configuration		
Event Log	[Space available]	-- Not editable
View Event Log		-- [Enter] Displays the event log
Event Logging	[Enable]	
Video Configuration		
AGP Aperture Size	[128 MB]	
Primary Video adapter	[AGP]	
Frame Buffer Size	[16 MB]	
USB Configuration		
USB Function	[Enable]	
High - Speed USB	[Enable]	
Legacy USB Support	[Enable]	
USB 2.0 Legacy Support	[HI - Speed]	
Chipset Configuration		
ISA Enable Bit	[Disable]	
PCI Latency Time	[32]	
Extended Configuration	[Default]	
Chipset Memory Timing Control		
SDRAM Frequency	[AUTO]	-- Not applicable
CPU override	[AUTO]	-- Not applicable
SDRAM Timing Control	[AUTO]	-- Not applicable
SDRAM RAS ACT. To Pre	[7]	-- Not applicable
SDRAM CAS Latency	[2.5]	-- Not applicable
SDRAM RAS# to CAS# Delay	[3]	-- Not applicable
SDRAM RAS# Precharge	[3]	-- Not applicable
Fan Control Configuration		
Fan Control	[Enable]	
Lowest Fan Speed	[Slow]	

Security menu screen

Supervisor password	:	Installed
User password	:	Not Installed
Set Supervisor password		
User Access Level	[No Access]	
Set User password		
Chassis Intrusion	[Disable]	

Power

ACPI

ACPI Suspend State	[S1 State]
Wake on Lan from S5	[stay off]
After Power Failure	[Stay OFF]
Wake On PCI PME	[Stay OFF]

Boot

Silent Boot	[Enable]
Intel (R) rapid BIOS Boot	[Enable]
Scan User Flash Area	[Enable]
PXT Boot To LAN	[Disable]
USB Boot	[Disable]

Boot Device Priority

1ST Boot Device	[GCE-8526B]	-- Current CDRW
2ND Boot Device	[HDS728080PLAT20]	-- Current HDD
3 RD Boot Device	[Disable]	

b.) BTO5 BEP3 BIOS set up condition

Main menu screen

BIOS Version	BF86510A.86.A.0069.P21	
Process Type	Intel Pentium 4	-- Not editable
Process Speed	2.8Ghz	-- Not editable
System Bus Speed	533Mhz	-- Not editable
System Memory Speed	333Mhz	-- Not editable
Cache RAM	512KB	-- Not editable
Total Memory	512MB	-- Not editable
Memory Mode	Single channel	-- Not editable
Memory Channel A Slot 0	512MB (DDR333)	
Memory Channel A Slot 1		-- Not editable
Memory Channel B Slot 0		-- Not editable
Memory Channel B Slot 1		-- Not editable
Language	[English]	
System time	[04:22:55]	-- Current Time Setting
System Data	[The 01 / 3 /2005]	-- Current Date Setting

Advanced menu screen

PCI Configuration

PCI Slot 1 IRQ Priority	[AUTO]
PCI Slot 2 IRQ Priority	[AUTO]
PCI Slot 3 IRQ Priority	[AUTO]
PCI Slot 4 IRQ Priority	[AUTO]
PCI Slot 5 IRQ Priority	[AUTO]
PCI Slot 6 IRQ Priority	[AUTO]

Boot Configuration

Plug & Play O/S	[NO]
Num lock	[ON]

Peripheral Configuration		
Serial Port A	[AUTO]	
Parallel Port	[AUTO]	
Mode	[ECP]	
Audio	[Enable]	
LAN Device	[Enable]	
ASF Support	[Disabled]	
Device Configuration		
ATA/IDE Configuration	[Enhanced]	
PCI IDE Bus Master	[Enhanced]	
Hard Disk Pre-Delay	[Disabled]	
SATA Port-0	[Not detected]	
SATA Port-1	[Not detected]	
PATA Primary Master	[HDS728080PLAT20]	-- Current HDD
PATA Primary Slave	[Not detected]	
PATA Secondary Master	[GCE-8526B]	-- Current CDRW
PATA Secondary Slave	[Optional]	-- Optional MOD
Floppy Configuration		
Diskette Controller	[Disabled]	
Event Log Configuration		
Event Log	[Space available]	-- Not editable
View Event Log		-- [Enter] Displays the event log
Event Logging	[Enable]	
Video Configuration		
AGP Aperture Size	[128 MB]	
Primary Video adapter	[AGP]	
Frame Buffer Size	[16 MB]	

USB Configuration

USB Function	[Enable]	
High - Speed USB	[Enable]	
Legacy USB Support	[Enable]	
USB 2.0 Legacy Support	[HI - Speed]	

Chipset Configuration

ISA Enable Bit	[Disable]	
PCI Latency Time	[32]	
Extended Configuration	[Default]	
Chipset Memory Timing Control		
SDRAM Frequency	[AUTO]	-- Not applicable
CPU override	[AUTO]	-- Not applicable
SDRAM Timing Control	[AUTO]	-- Not applicable
SDRAM RAS ACT. To Pre	[7]	-- Not applicable
SDRAM CAS Latency	[2.5]	-- Not applicable
SDRAM RAS# to CAS# Delay	[3]	-- Not applicable
SDRAM RAS# Precharge	[3]	-- Not applicable

Fan Control Configuration

Fan Control	[Enable]
Lowest Fan Speed	[Slow]

Security menu screen

Supervisor password	:	Installed
User password	:	Not Installed
Set Supervisor password		
User Access Level	[No Access]	
Set User password		
Chassis Intrusion	[Disable]	

Power

ACPI

ACPI Suspend State	[S1 State]
Wake on Lan from S5	[stay off]
After Power Failure	[Stay OFF]
Wake On PCI PME	[Stay OFF]

Boot

Silent Boot	[Enable]
Intel (R) rapid BIOS Boot	[Enable]
Scan User Flash Area	[Enable]
PXT Boot To LAN	[Disable]
USB Boot	[Disable]

Boot Device Priority

1ST Boot Device	[GCE-8526B]	-- Current CDRW
2ND Boot Device	[HDS728080PLAT20]	-- Current HDD
3 RD Boot Device	[Disable]	

8-8-1-8 Check the Device Driver Configuration.(BEP2)

After System boot up. confirm the installed device information.

Double click Go Device Manager Icon

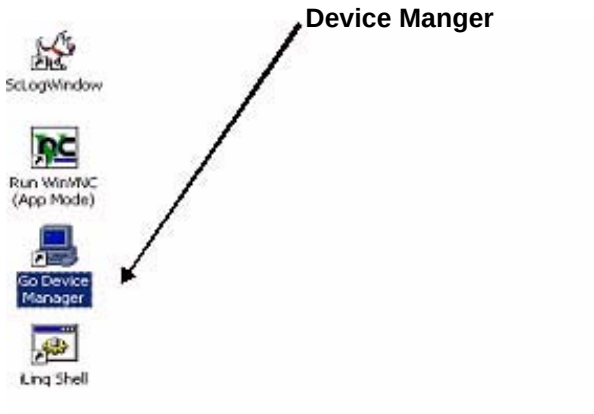


Figure 8-126 Device Manager

1.) Check VGA Driver and PCI Video Driver are enrolled on Display adapter section.

Figure 8-127 Display Adapter

2.) Check The PCI Bridge Between FEC Assy and PC2IP Assy under multi function adapters

Figure 8-128 Multi Function Adapter

3.) Check the Sound Driver is On board Sound (Sound Max).

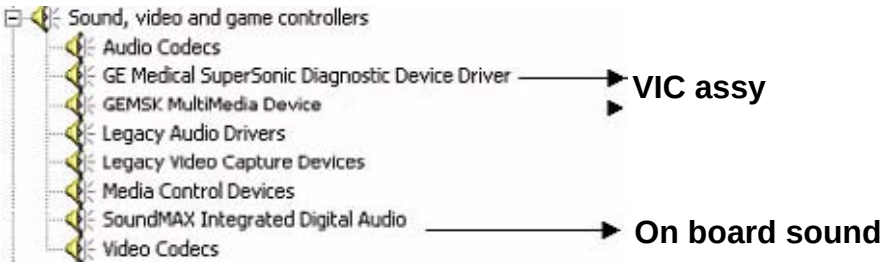


Figure 8-129 Sound Driver

4.) Check the VIC Assy Driver is GE Medical SuperSonic Diagnostic Device Driver and GEMSK Multimedia Device

5.) Check The USB Device Driver.

8-8-1-8 Check the Device Driver Configuration.(BEP2) (cont'd)

6.) L5 Keyboard Communicates with Jupiter Human Interface by USB Protocol.

Universal Serial Bus controllers
Generic USB Hub
Intel(R) 82801DB/DBM USB Universal Host Controller - 24C2
Intel(R) 82801DB/DBM USB Universal Host Controller - 24C4
Intel(R) 82801DB/DBM USB Universal Host Controller - 24C7
Jupiter Human Interface
USB Mass Storage Device
USB Root Hub
USB Root Hub
USB Root Hub

Figure 8-130 Jupiter Human Interface Driver

7.) Check The Network Device Driver.

8-8-1-9 Check the Device Driver Configuration.(BEP3)

After System boot up. confirm the installed device information.

Double click Go Device Manager Icon

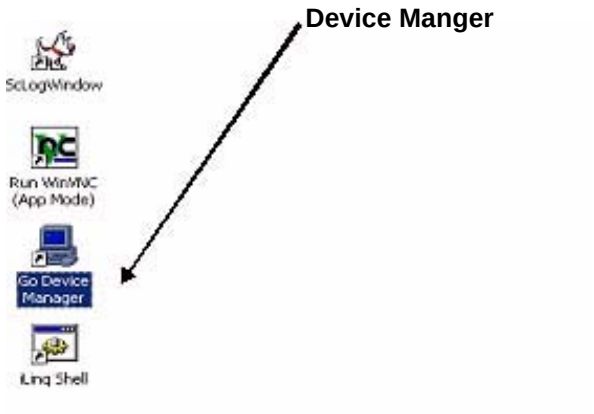


Figure 8-131 Device Manager

1.) Disk driver check

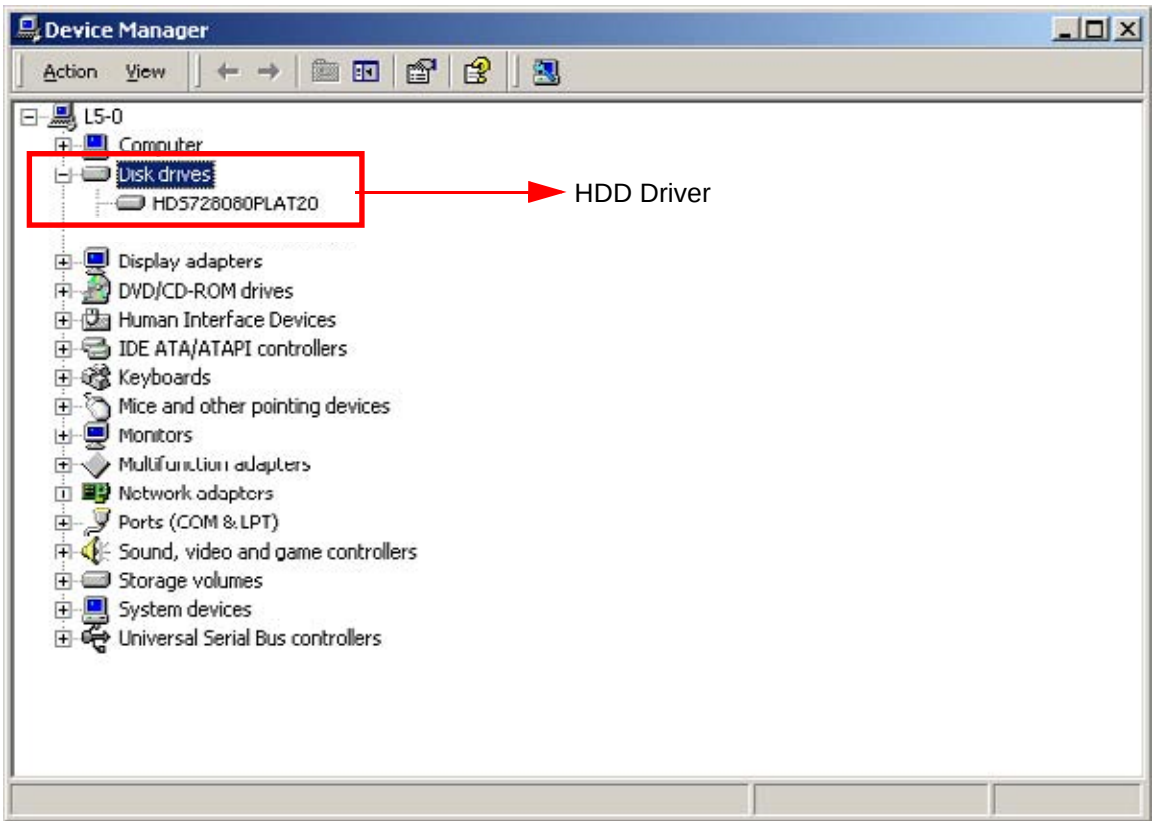


Figure 8-132 Disk Driver Check

8-8-1-9 Check the Device Driver Configuration.(BEP3) (cont'd)

2.) Display adapter check

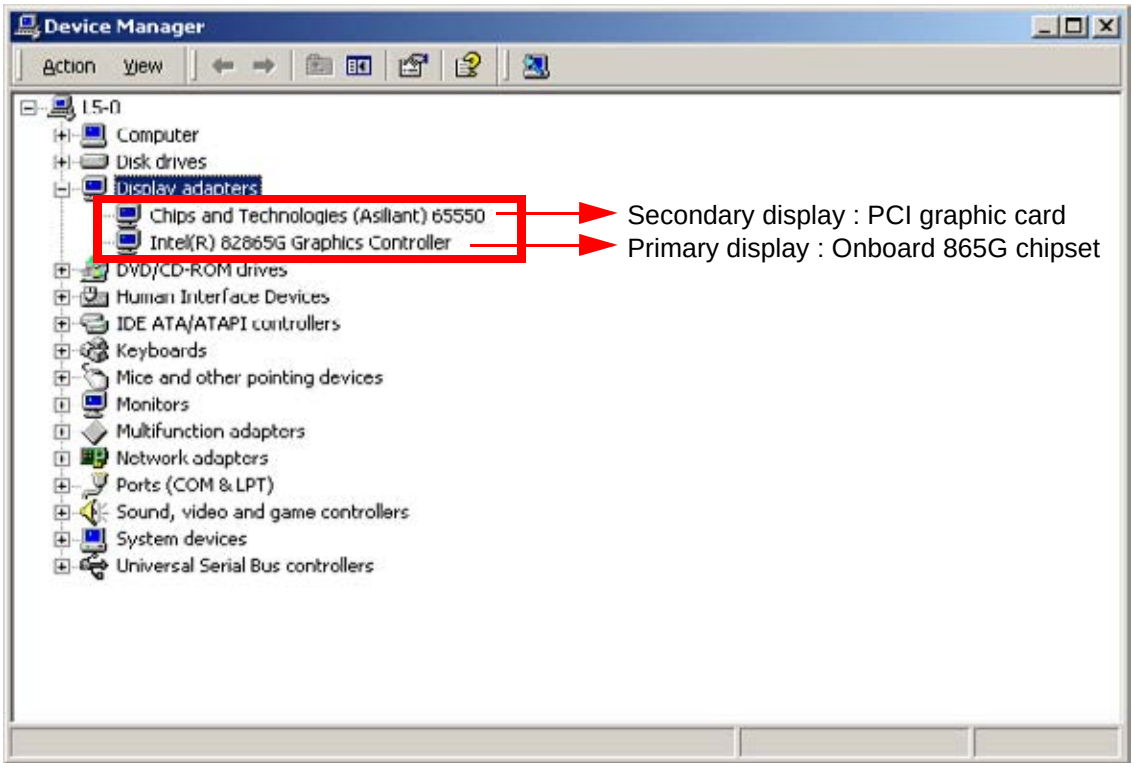


Figure 8-133 Display adapter Check

3.) DVD/CD-ROM driver check

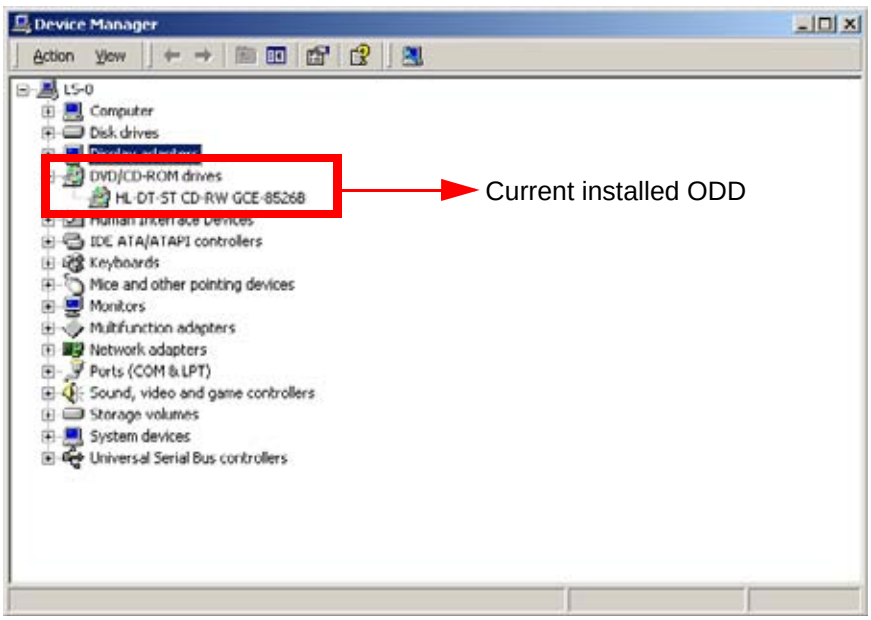


Figure 8-134 DVD/CD-ROM driver check

8-8-1-9 Check the Device Driver Configuration.(BEP3) (cont'd)

4.) Human Interface Devices check

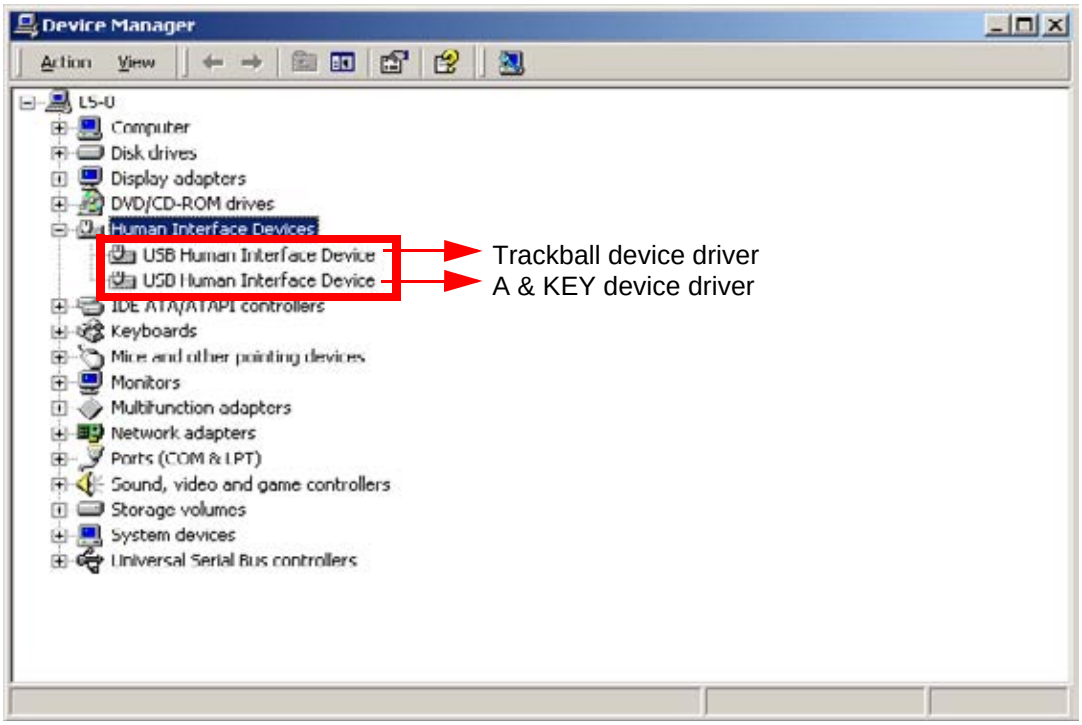


Figure 8-135 Human Interface Devices check

5.) IDE ATA/ATAPI controllers check

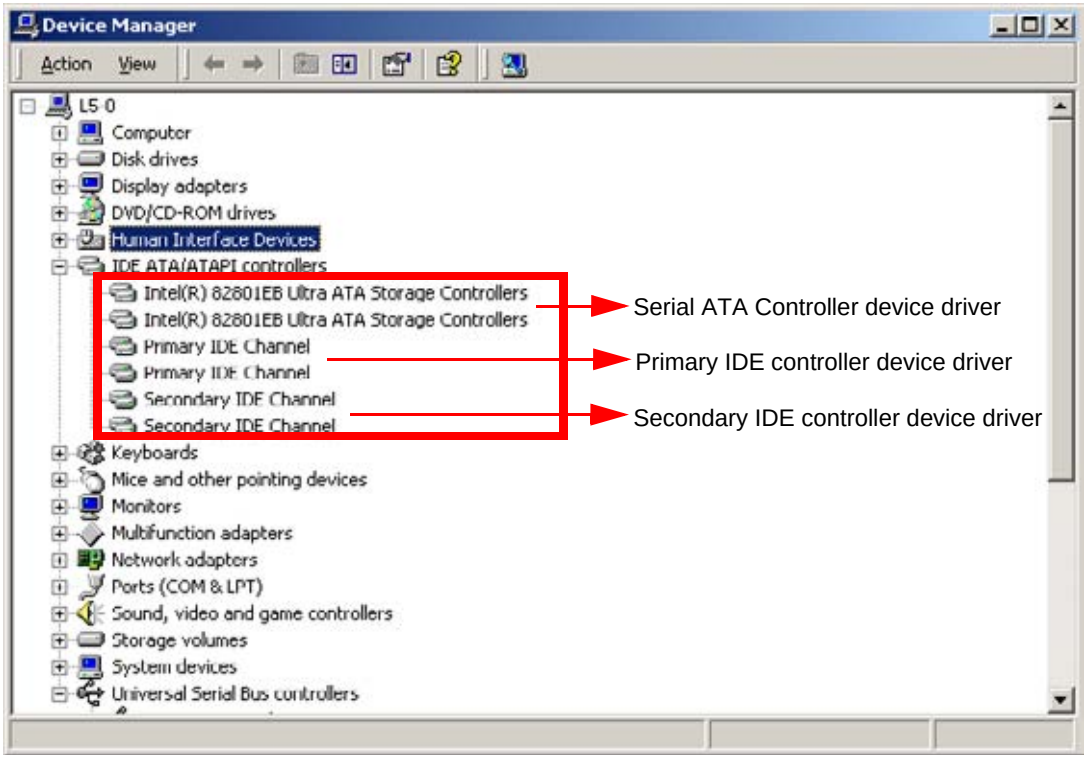


Figure 8-136 IDE ATA/ATAPI controllers check

8-8-1-9 Check the Device Driver Configuration.(BEP3) (cont'd)

6.) Monitor check

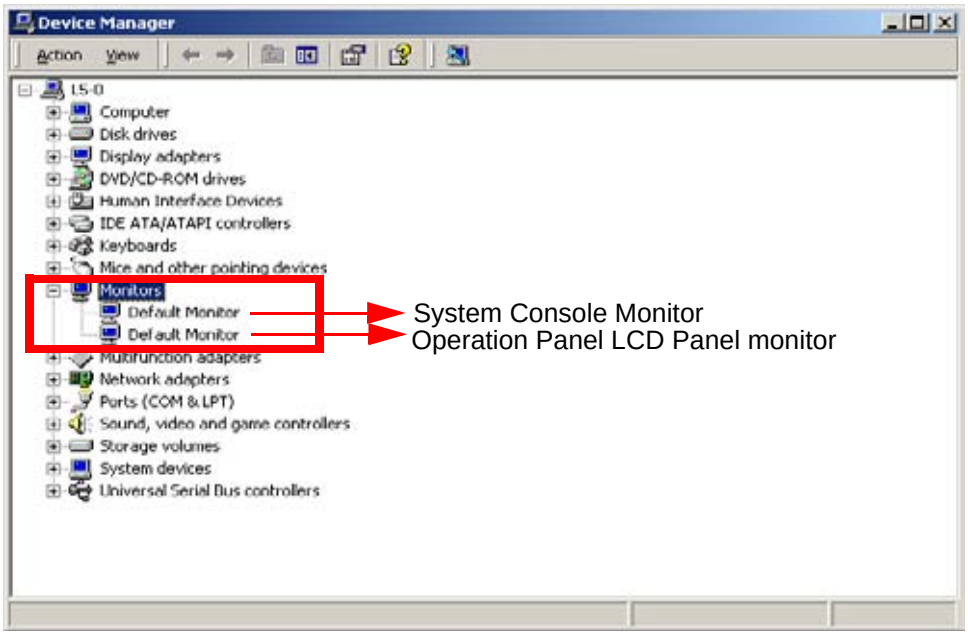


Figure 8-137 Monitor check

7.) Multifunction adapters check

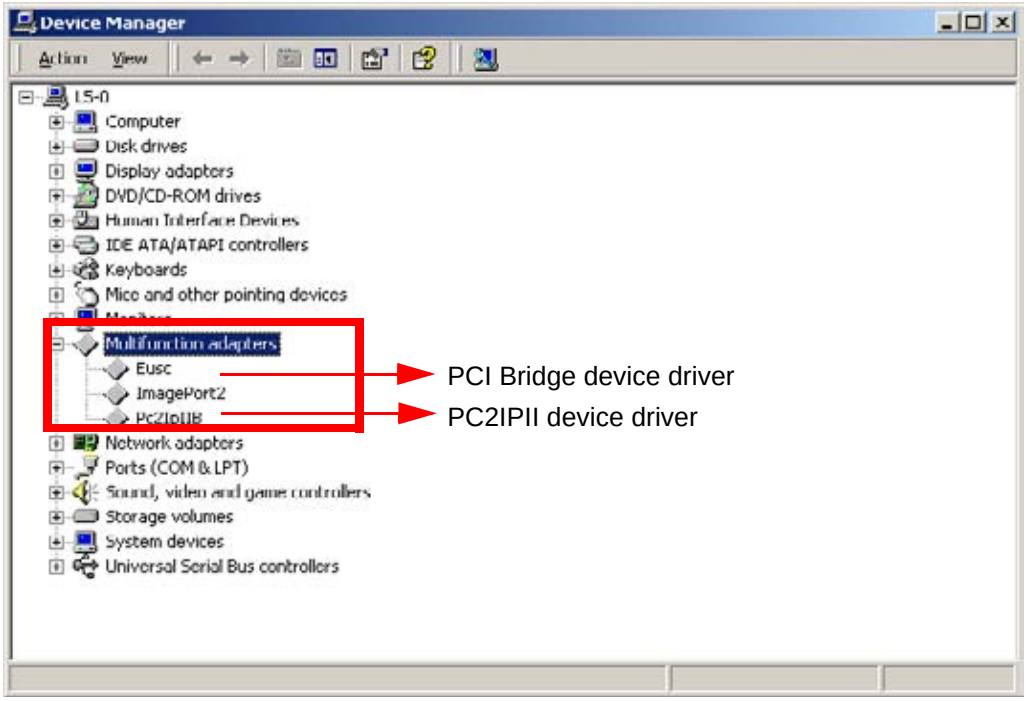


Figure 8-138 Multifunction adapters check

8-8-1-9 Check the Device Driver Configuration.(BEP3) (cont'd)

8.) Network adapters check

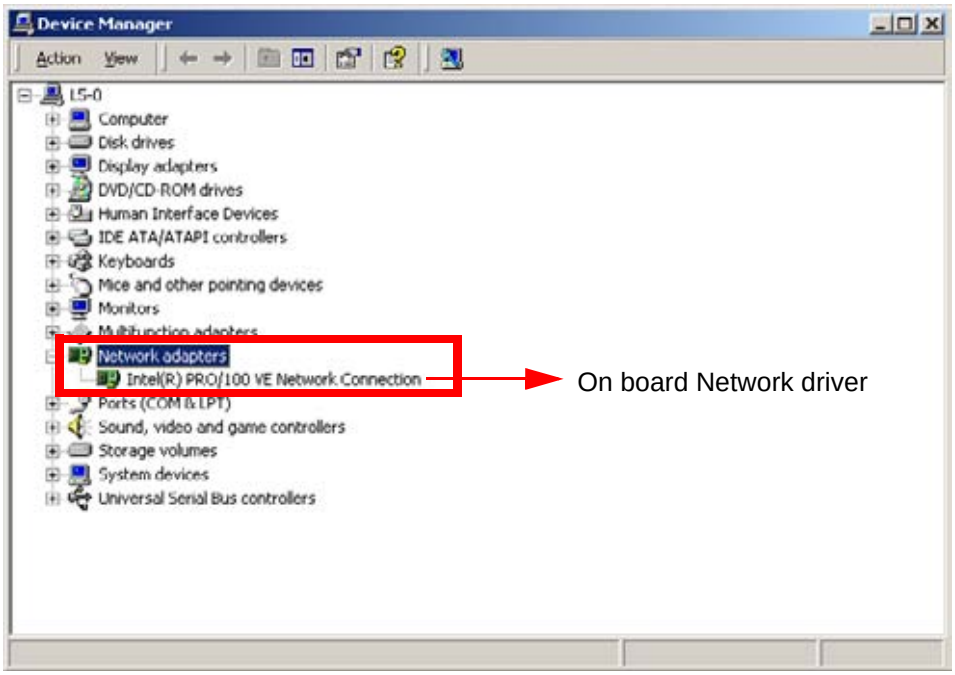


Figure 8-139 Network adapters check

9.) Ports (COM &LTP) check

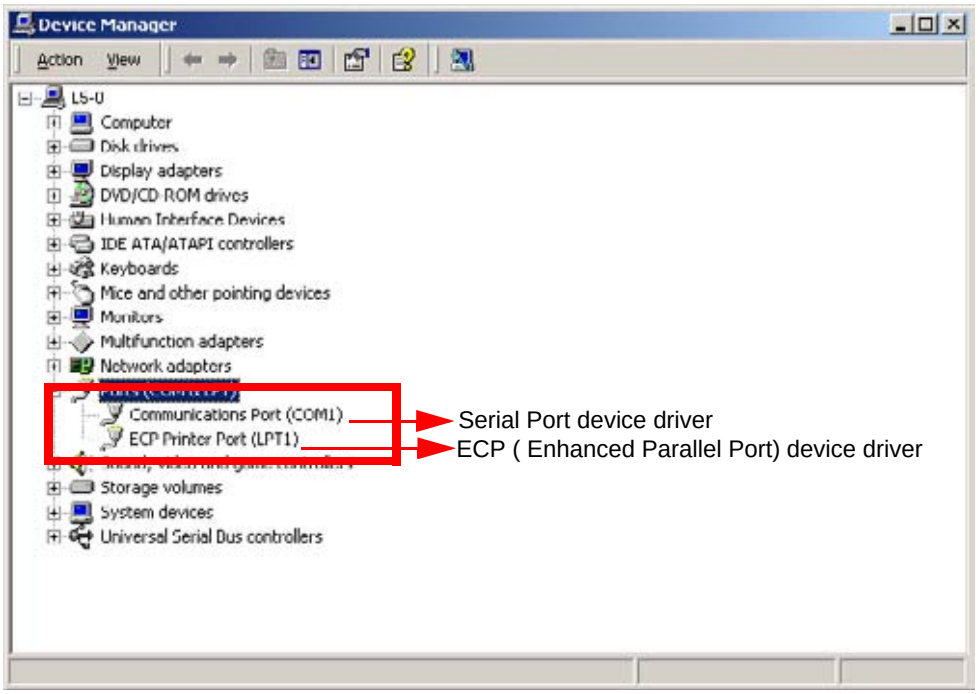


Figure 8-140 Ports (COM &LTP) check

8-8-1-9 Check the Device Driver Configuration.(BEP3) (cont'd)

10.) VIC driver check

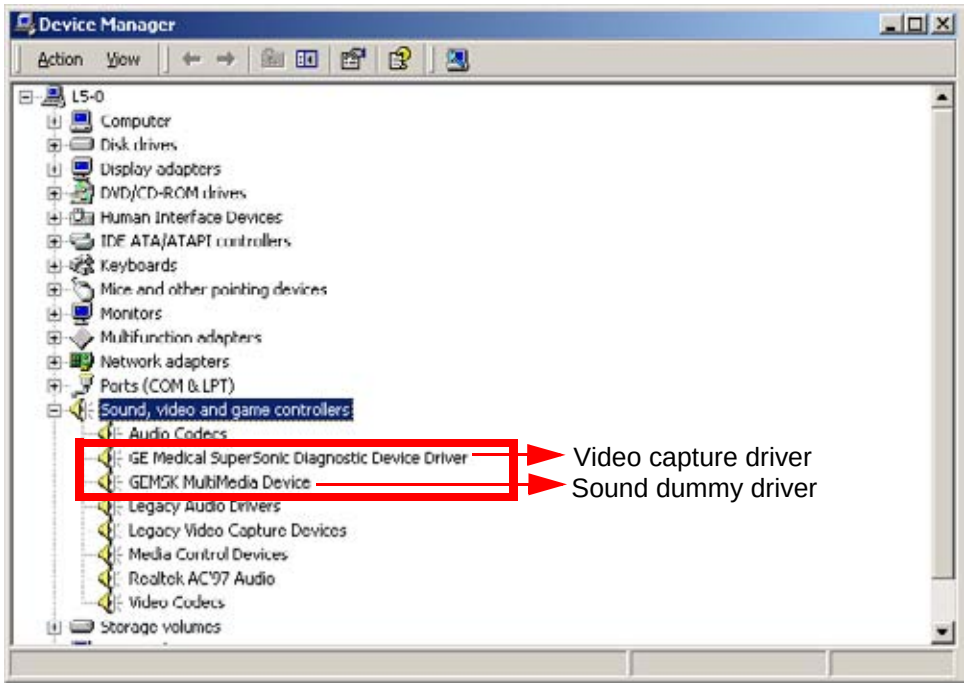


Figure 8-141 VIC driver check

11.) On board sound driver check

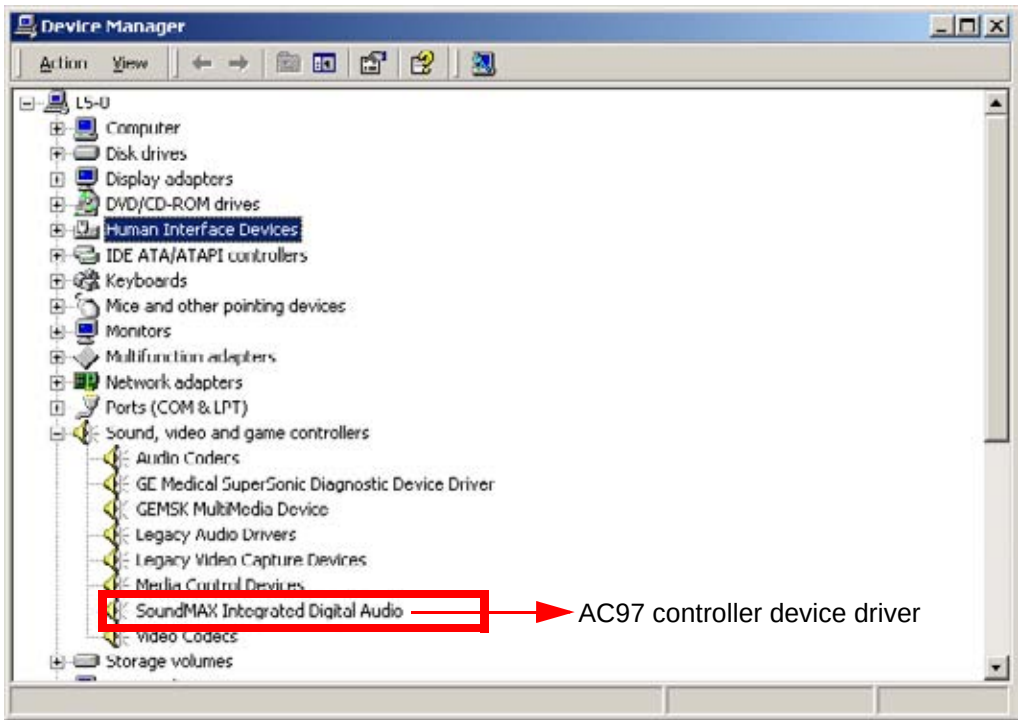


Figure 8-142 On board sound driver check

8-8-1-9 Check the Device Driver Configuration.(BEP3) (cont'd)

12.) USB driver check (logical, Physical, Jupiter Human interface)

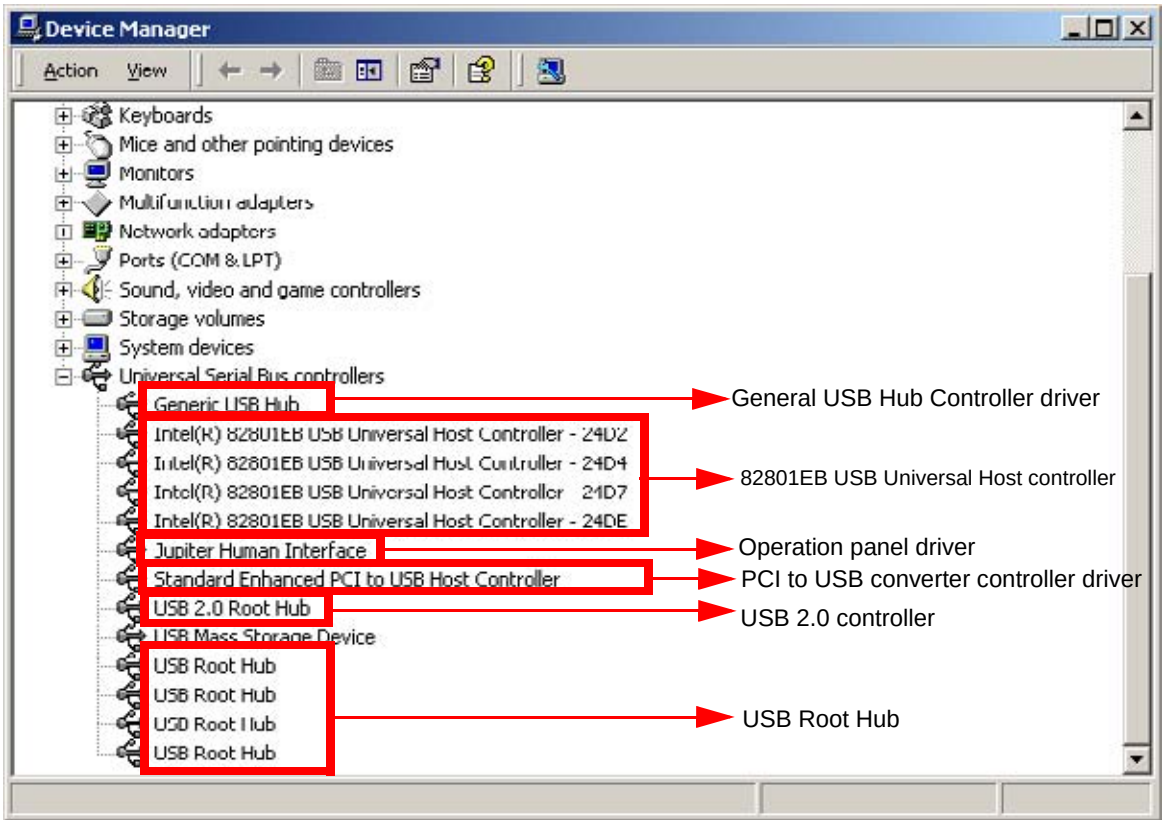


Figure 8-143 USB driver check

8-8-1-10 Check the Device Driver Configuration.(BT05 BEP3)

After System boot up. confirm the installed device information.

Double click Go Device Manager Icon

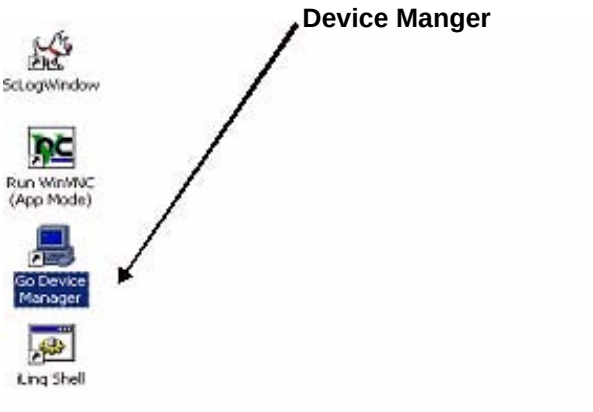


Figure 8-144 Device Manager

1.) Disk driver check

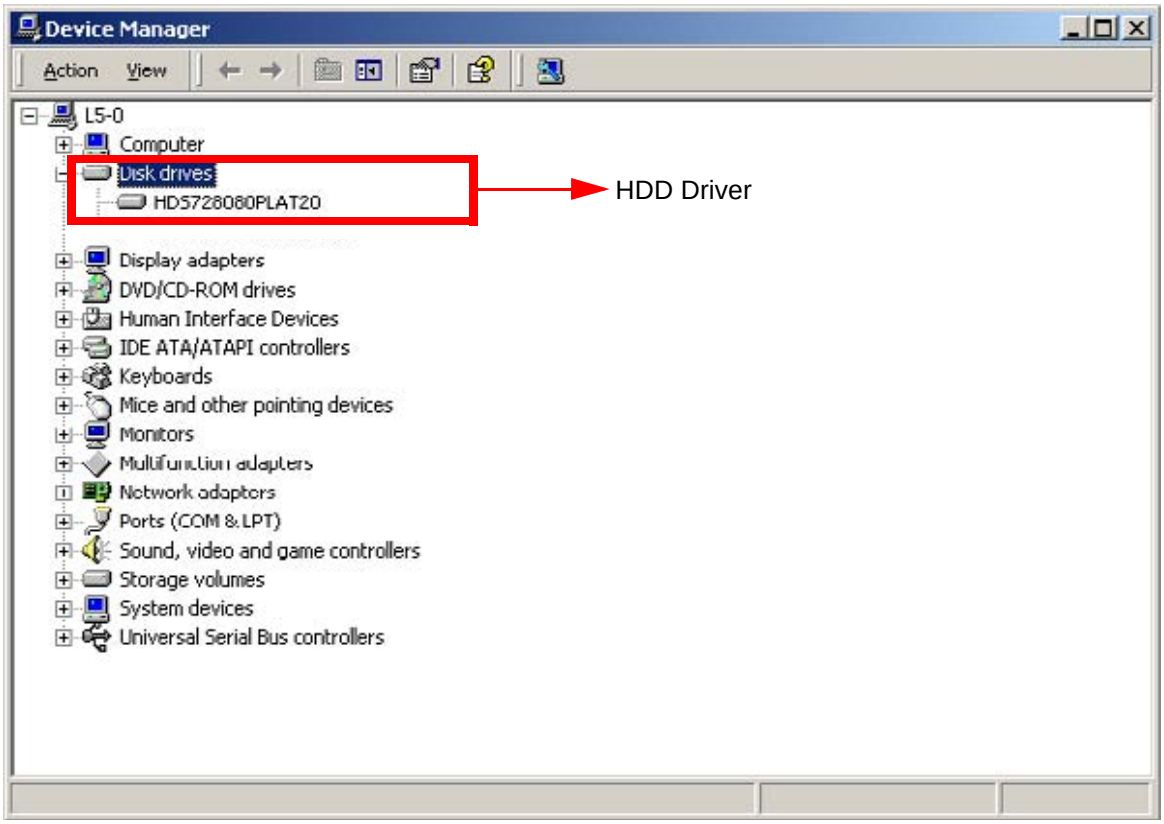


Figure 8-145 Disk driver check

8-8-1-10 Check the Device Driver Configuration.(BT05 BEP3) (cont'd)

2.) Display adapter check

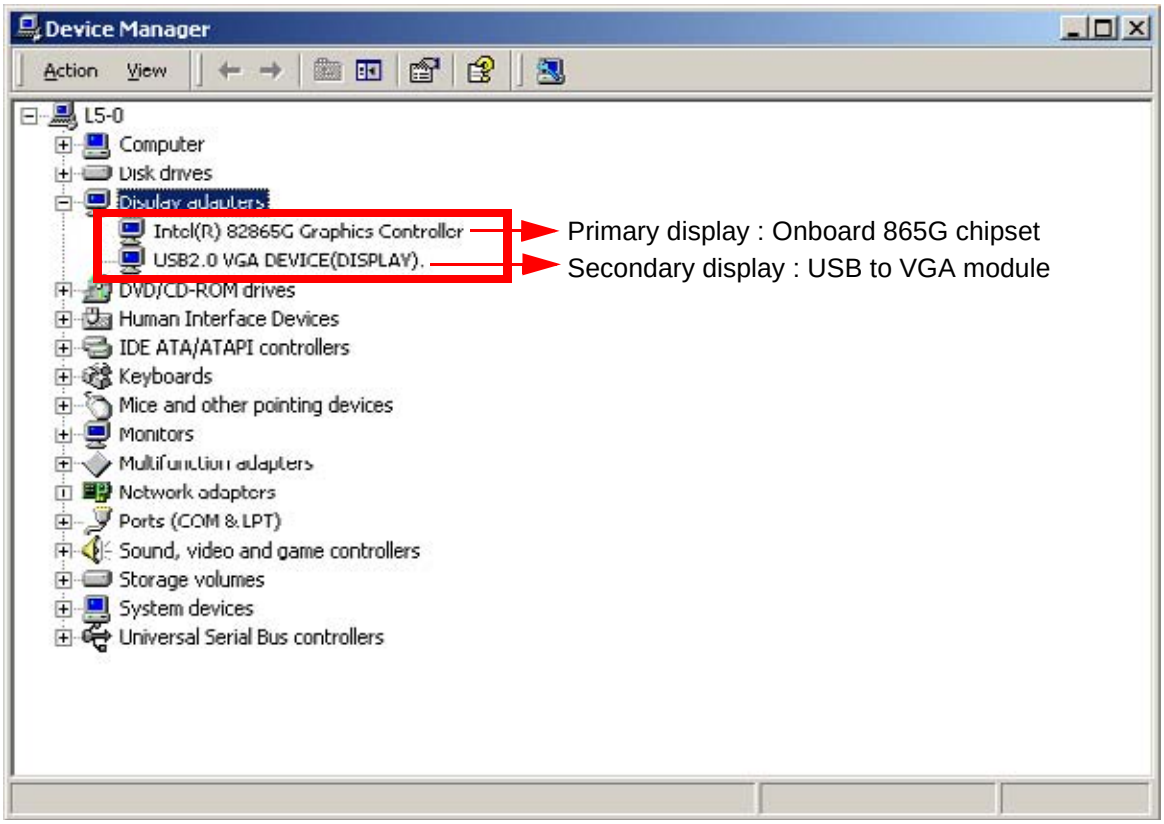


Figure 8-146 Display adapter check

3.) DVD/CD-ROM driver check

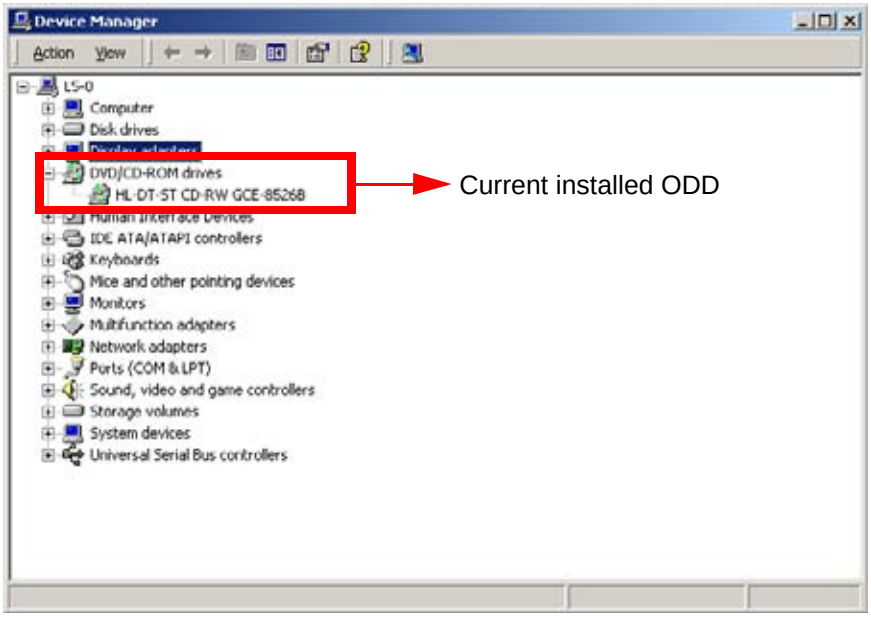


Figure 8-147 DVD/CD-ROM driver check

8-8-1-10 Check the Device Driver Configuration.(BT05 BEP3) (cont'd)

4.) Human Interface Devices check

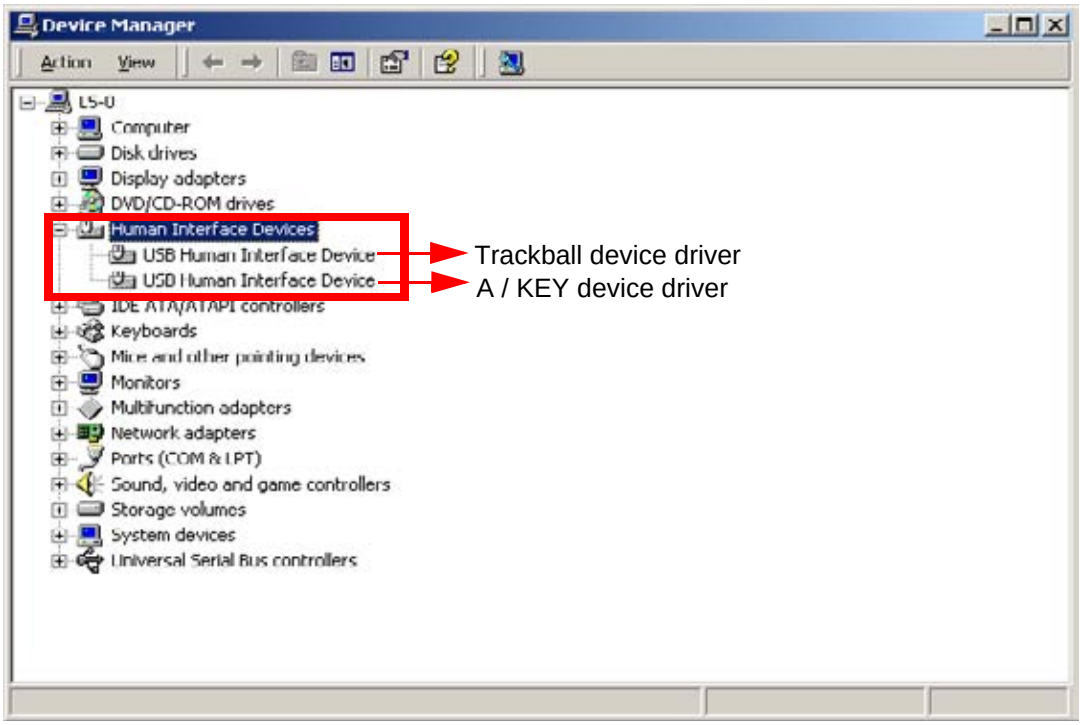


Figure 8-148 Human Interface Devices check

5.) IDE ATA/ATAPI controllers check

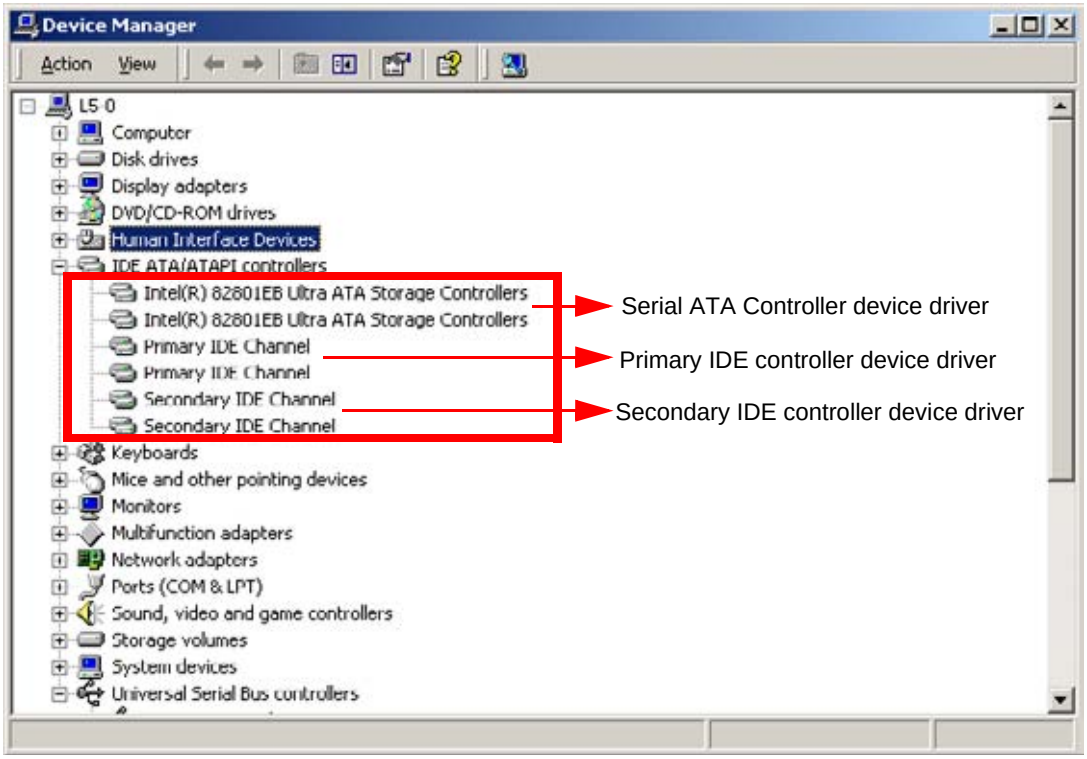


Figure 8-149 IDE ATA/ATAPI controllers check

8-8-1-10 Check the Device Driver Configuration.(BT05 BEP3) (cont'd)

6.) Monitor check

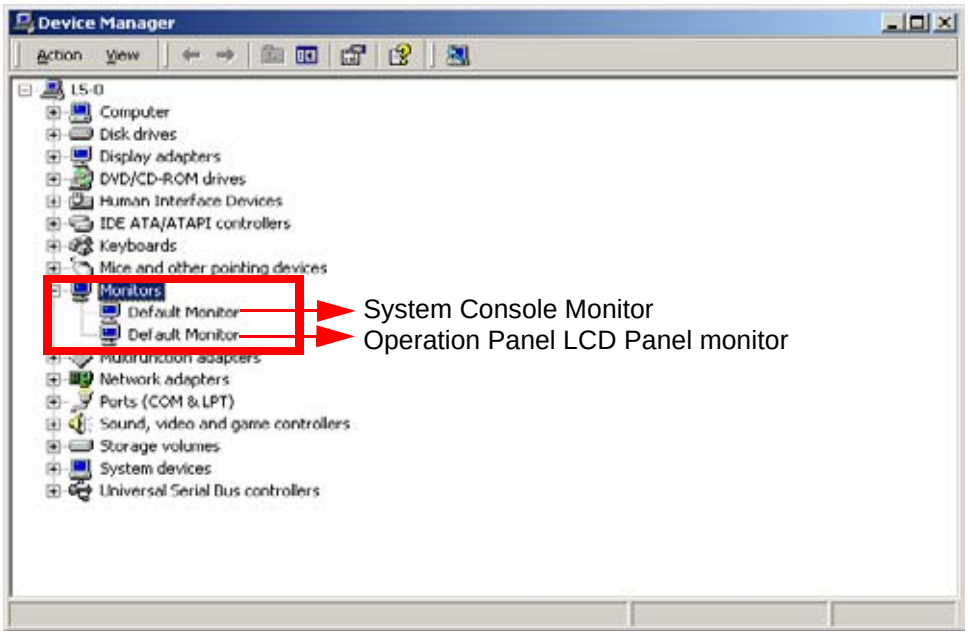


Figure 8-150 Monitor check

7.) Multifunction adapters check

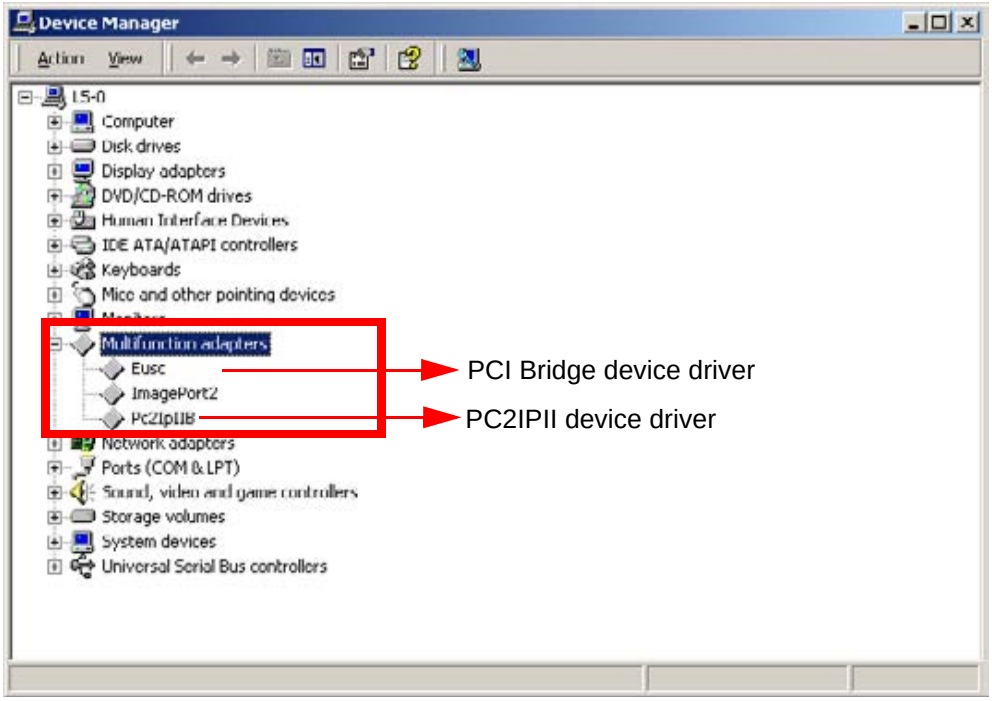


Figure 8-151 Multifunction adapters check

8-8-1-10 Check the Device Driver Configuration.(BT05 BEP3) (cont'd)

8.) Network adapters check

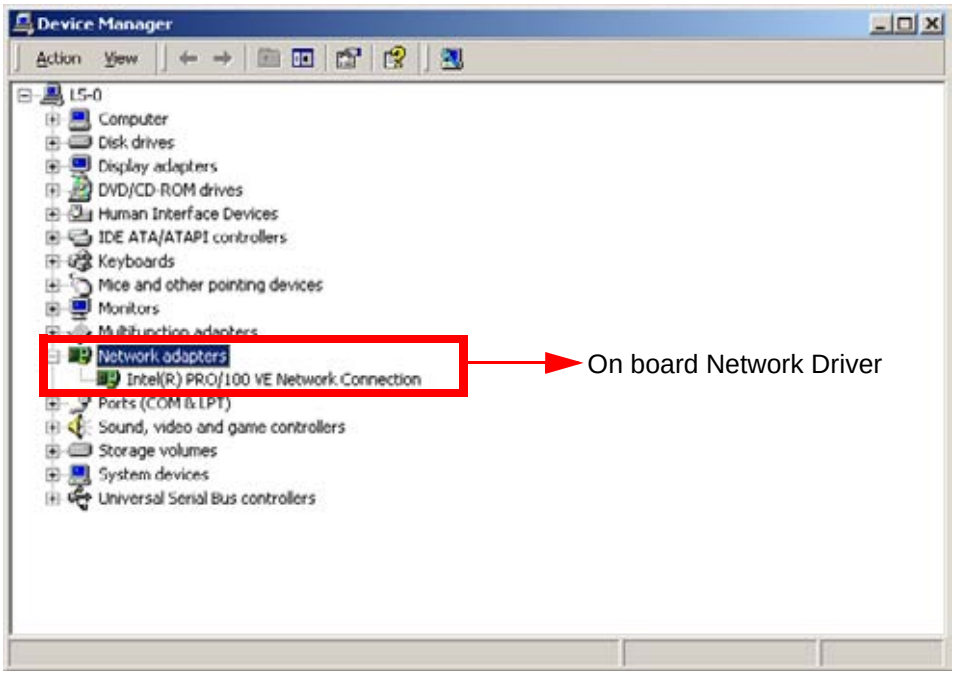


Figure 8-152 Network adapters check

9.) Ports (COM &LTP) check

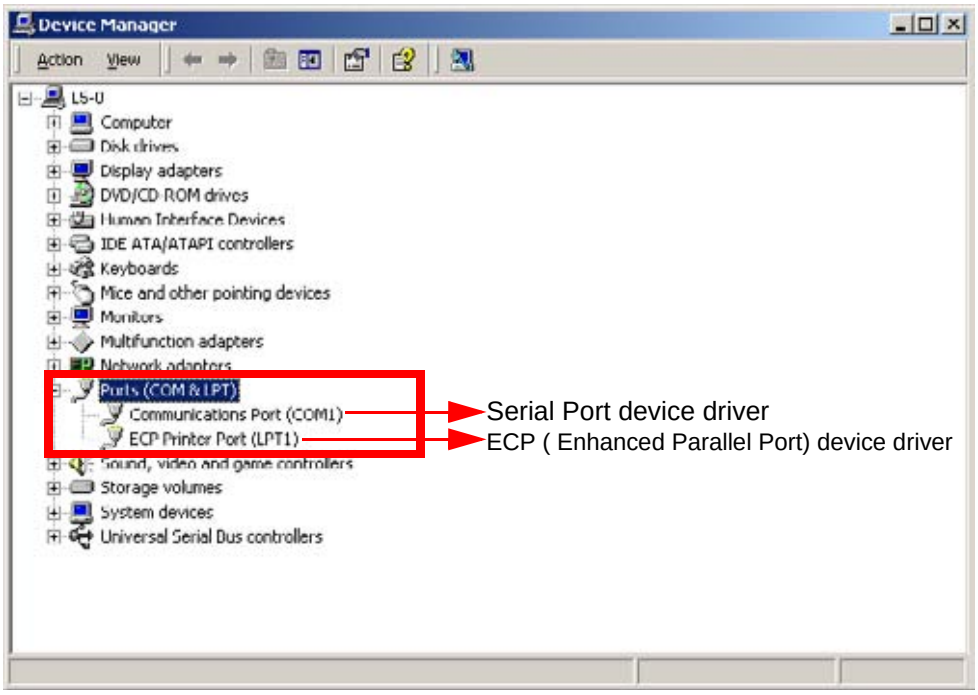


Figure 8-153 Ports (COM &LTP) check

8-8-1-10 Check the Device Driver Configuration.(BT05 BEP3) (cont'd)

10.) VIC driver check

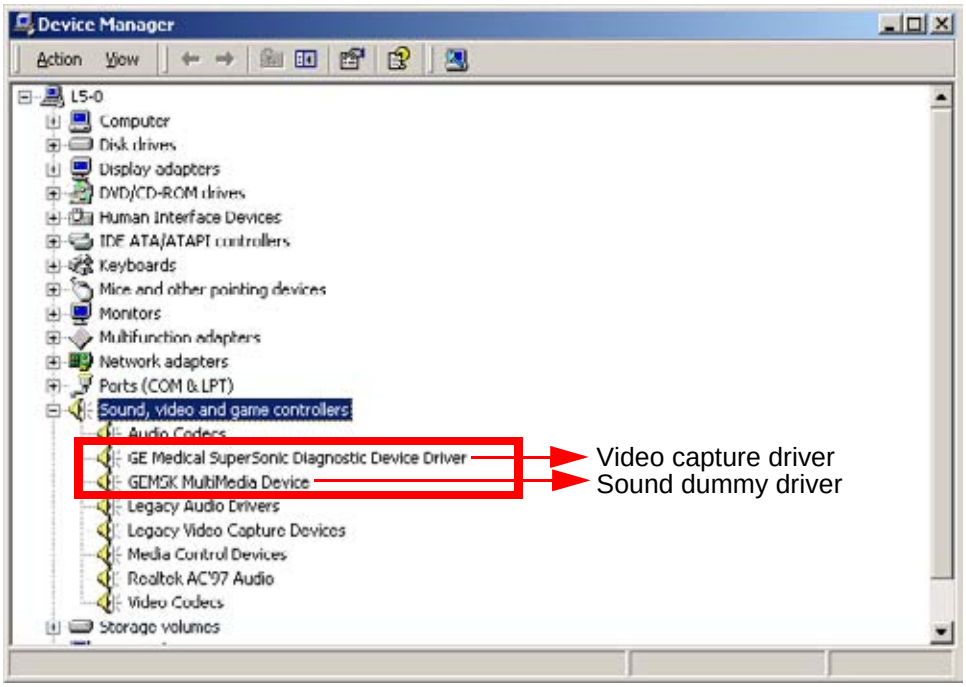


Figure 8-154 VIC driver check

11.) On board sound driver check

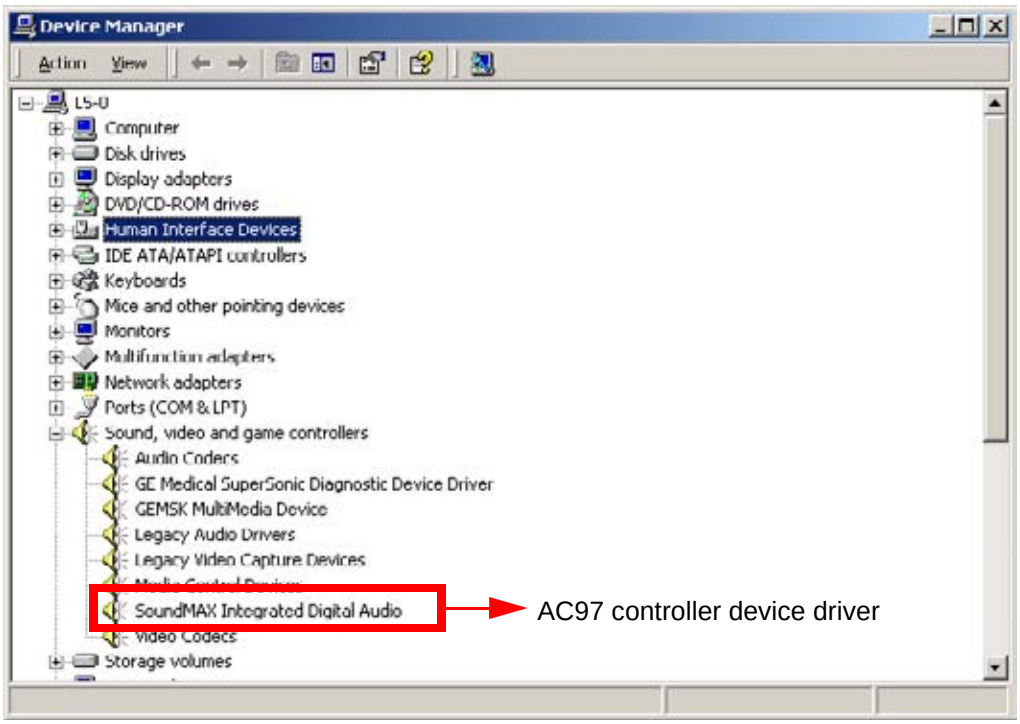


Figure 8-155 On board sound driver check

8-8-1-10 Check the Device Driver Configuration.(BT05 BEP3) (cont'd)

12.) USB driver check (logical, Physical, Jupiter Human interface)

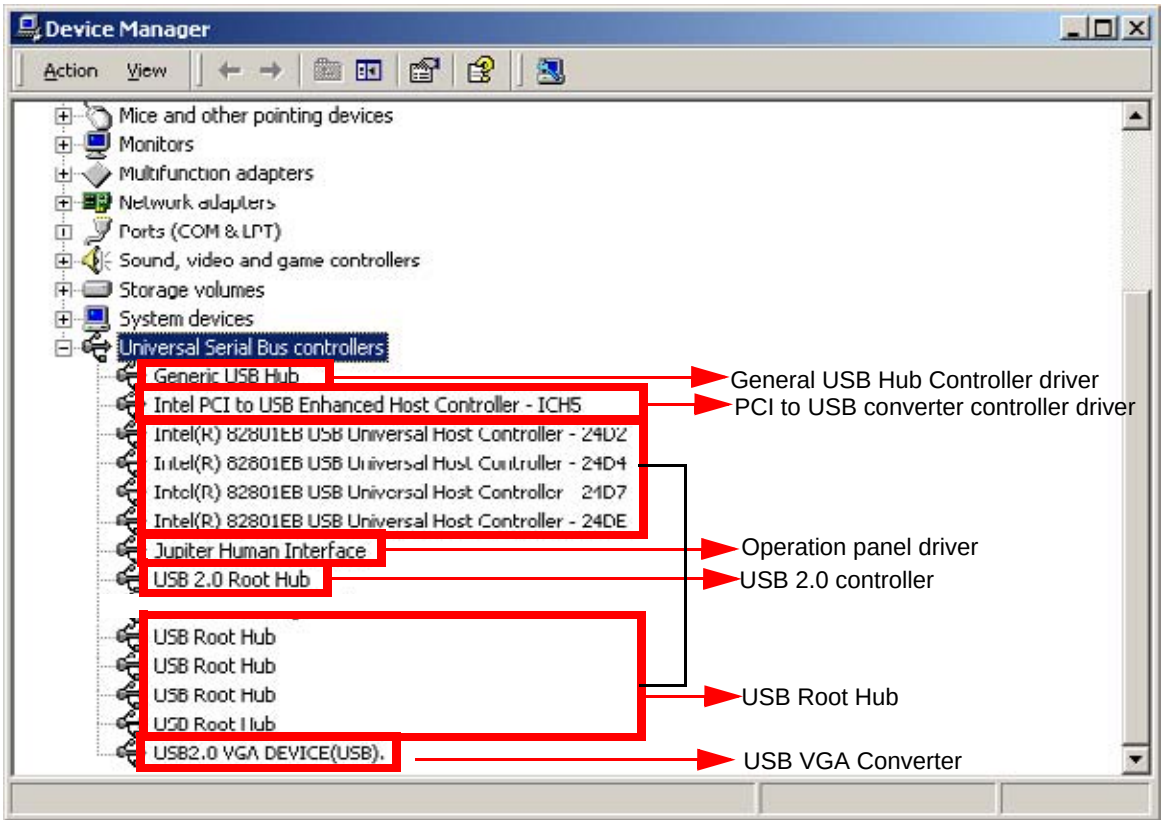

Device Manager
Action View
Mice and other pointing devices
Monitors
Multifunction adapters
Network adapters
Ports (COM & LPT)
Sound, video and game controllers
Storage volumes
System devices
Universal Serial Bus controllers
Generic USB Hub
Intel PCI to USB Enhanced Host Controller - ICH5
Intel(R) 82801EB USB Universal Host Controller - 24D2
Intel(R) 82801EB USB Universal Host Controller - 24D4
Intel(R) 82801EB USB Universal Host Controller - 24D7
Intel(R) 82801EB USB Universal Host Controller - 24DE
Jupiter Human Interface
USB 2.0 Root Hub
USB Root Hub
USB Root Hub
USB Root Hub
USB Root Hub
USB2.0 VGA DEVICE(USB).
General USB Hub Controller driver
PCI to USB converter controller driver
Operation panel driver
USB 2.0 controller
USB Root Hub
USB VGA Converter

Figure 8-156 USB driver check

8-8-1-11 Application S/W Install.

After Checking Device Driver and then Install application S/W by inserting CD into CD RW Driver.

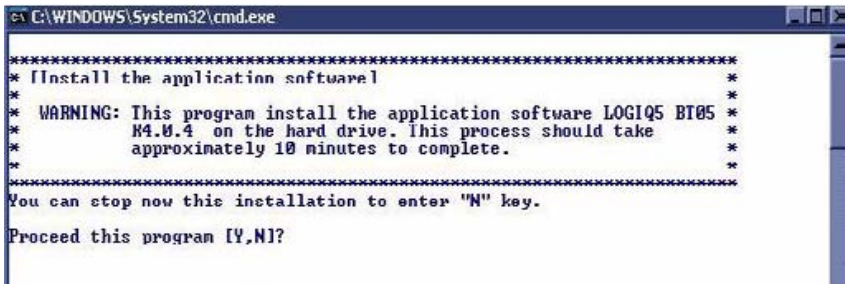

C:\WINDOWS\System32\cmd.exe
* [Install the application software] *
* WARNING: This program install the application software LOGIQ5 BT05 R4.0.4 on the hard drive. This process should take approximately 10 minutes to complete.
You can stop now this installation to enter "N" key.
Proceed this program [Y,N]?

Figure 8-157 Installation Application Software

1.) Press the "Y" key to continue. Then the program requests confirmation - "Are you sure?" then Press the "Y" key again.

2.) The installation process will be started. it will take about 15 minutes.

3.) To apply the preset by region, select one of the below options. Refer to Figure 8-158.

4.) Select fit Region as Below Menu.

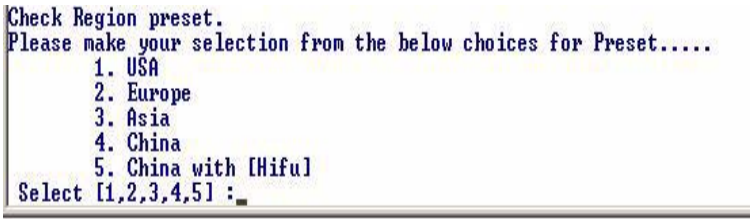


Figure 8-158 Select Region

5.) When the process has completed, you will see the following message.

Figure 8-159 Complete message

6.) After the installation is complete, the system will power off automatically.

- If possible remove the CD from the drive while the system is rebooting.

8-8-2 VIC Assy

Purpose: This is a description on how to remove and replace the VIC assy in the BEP Assy.

8-8-2-1 Tools

- Common pillips screwdrivers

8-8-2-2 Needed Manpower

- 1 persons, 15minutes + travel

8-8-2-3 Preparations

- Shut Down the System and switch off the Main Breaker at the rear as described in section 4-3-2 on page 3.
- Left Cover should be removed before proceed. Refer to section 8-5-1 on page 39.

8-8-2-4 Removal Procedure

8-8-2-4-1 Mode setting for VIC assy

VIC assy have two jumpers for power control functionality. The cap position depend on BEP assy. Before replace the VIC assy, this mode jumper shoub be set up.

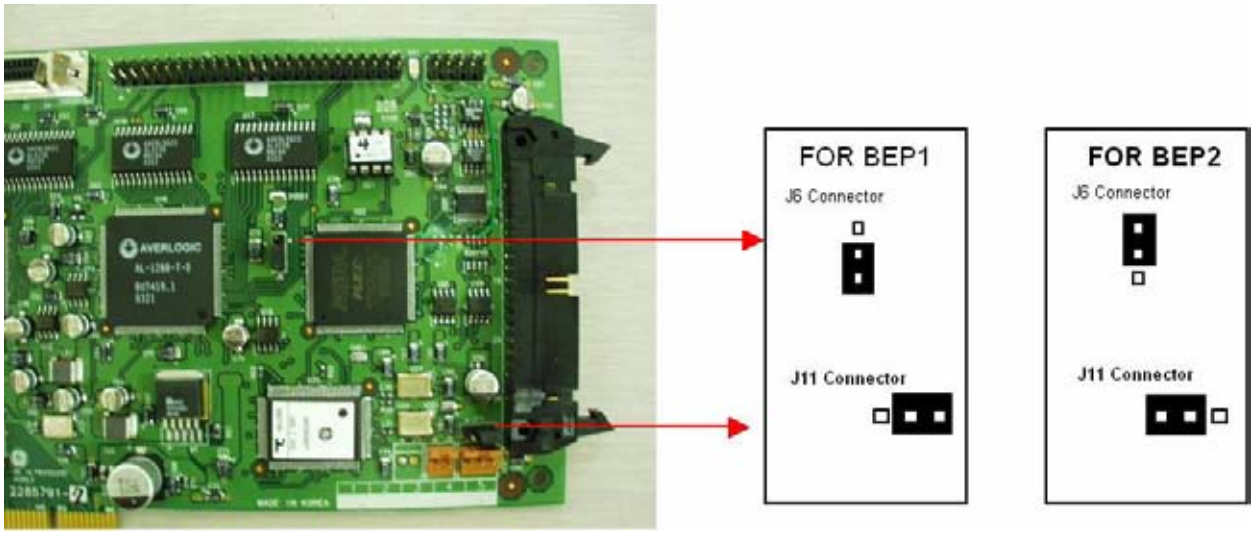


Figure 8-160 Mode set for VIC assy

8-8-2-4-2 Removal of VIC board

1.) Disconnect all of connect in VIC assy. Refer to Figure 8-161.

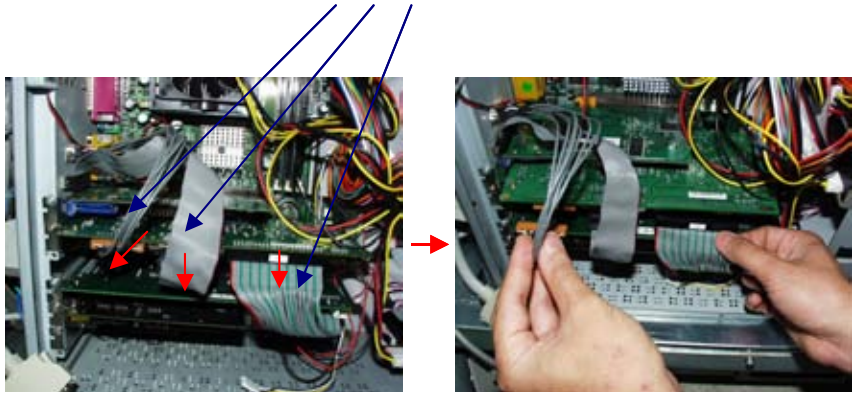


Figure 8-161 Connectors on VIC assy

2.) 5 connectors inside BEP. 14 pins connector to chassi from VIC. 50pin half pitch flat cable connector. 50pin flat cable connector to PC2IP card. 2 pin connector to motherboard for power control. 3 pin connector to motherboard for LED.

3.) Disconnect 2 connectors outside of BEP.

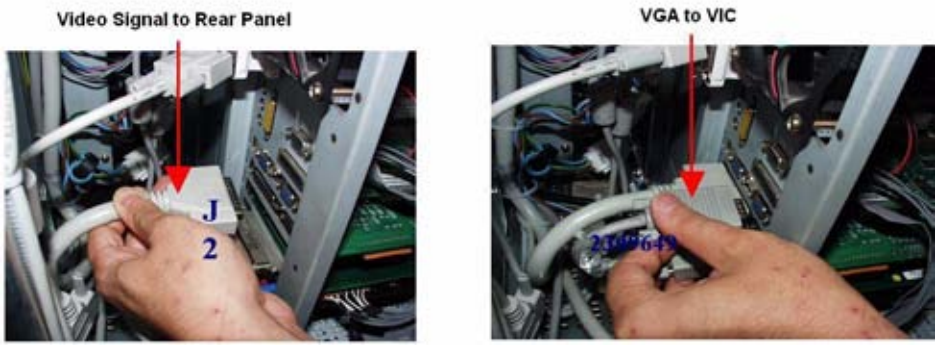


Figure 8-162 Video signal to Rear Panel & VGA to VIC

4.) Disconnect 2 connectors from motherboard.

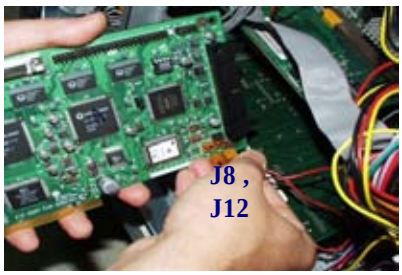


Figure 8-163 Disconnect 2 connectors

8-8-2-5 Mounting procedure

1.) Install the new parts in the reverse order of removal.

2.) Detail procedure of Harness routing about HDD LED cable and PWR cable.
In case of disconnection HDD cable and PWR cable from Mother Board.

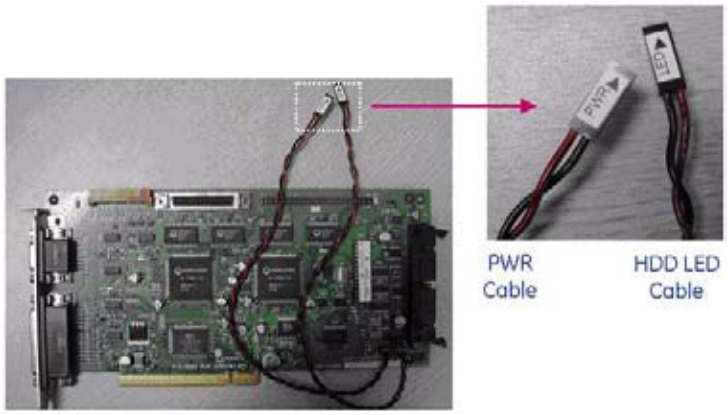


Figure 8-164 PWR Cable & HDD LED Cable with VIC Assy

Case 1. BEP 1

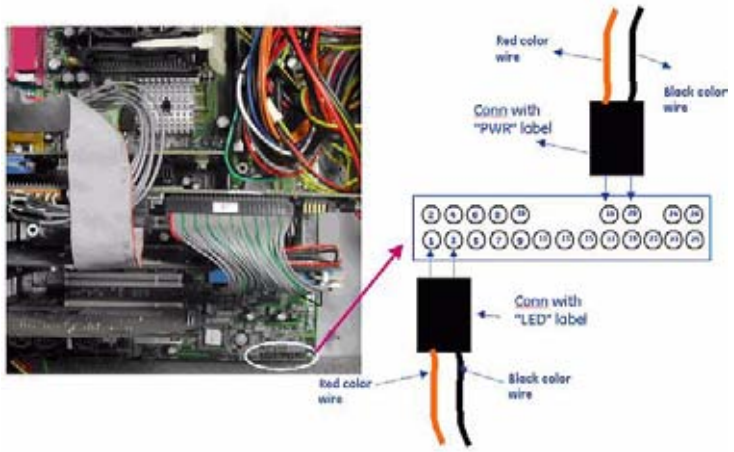


Figure 8-165 BEP1

8-8-2-5 Mounting procedure (cont'd)

Case 2. BEP 2

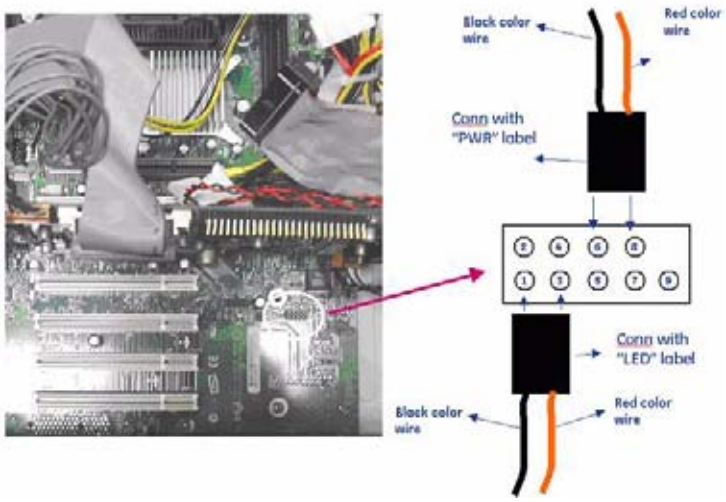


Figure 8-166 BEP2

Case 3. BEP3

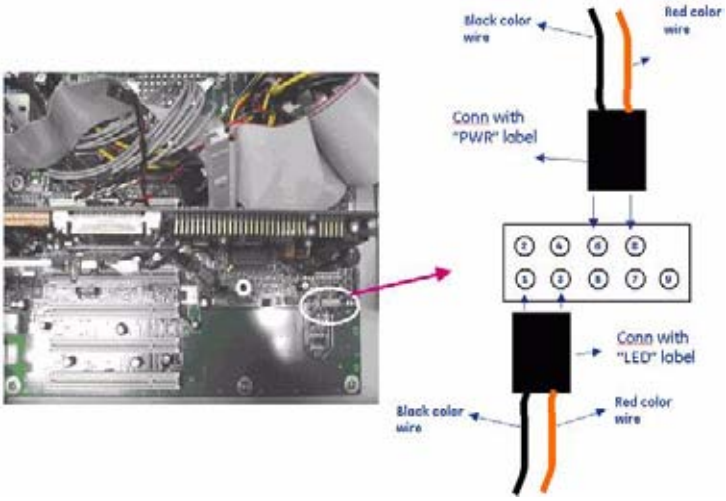


Figure 8-167 BEP3

8-8-2-5 Mounting procedure (cont'd)

Case 4. BEP4

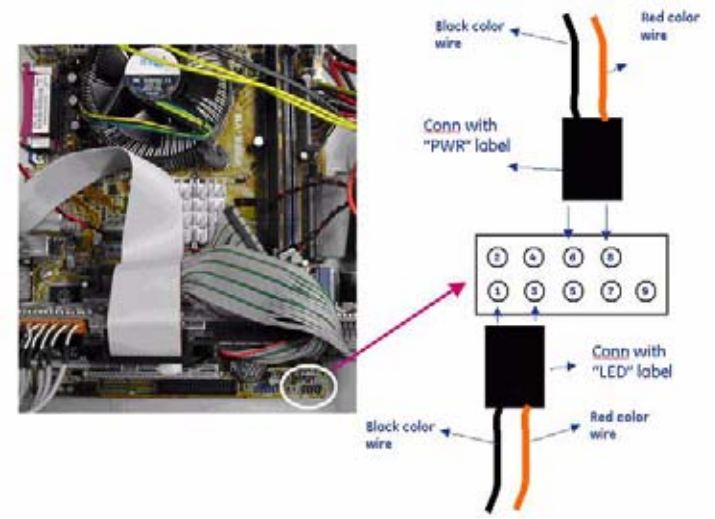


Figure 8-168 BEP4

3.) Perform the following functional tests. If all are successful, include the debrief script provided below.

Table 8-48 Functional Tests

Service Manual Section	Functional Test / Diagnostic Test	Debrief Script
Section 4-3-1	Power On/Boot Up	"Service Manual, Direction 2300000, Rev 1+, Section 8-8-2. Equipment passed all required tests and is ready for use. "
Section 4-3-2	Power Off / Shutdown	
Section 4-9-12	VIC Assy function check procedure	
Section 4-3-4	System B/M-Mode Checks	
Section 4-3-5	System CFM and PWD Checks	
Section 10-5-2	Functional Checks (See Also Chapter 4)	
Section 10-6	Using a Phantom	

8-8-2-6 Mounting Procedure

Install the new parts in the reverse order of removal.

8-8-3 SMPS Assy, Hard Disk, CD R/W

Purpose: This is a description on how to remove and replace the Parts in the BEP Assy.

8-8-3-1 Tools

- Common pillips screwdrivers

8-8-3-2 Needed Manpower

- 1 persons, 15 minutes + travel

8-8-3-3 Preparations

- Shut Down the System and switch off the Main Breaker at the rear as described in section 4-3-2 on page 3.
- Left Cover should be removed before proceed. Refer to section 8-5-1 on page 39.

8-8-3-4 Removal Procedure

1.) Open front base cover and front cover. Refer to section 8-5-6 on page 49, section 8-5-7 on page 51.

2.) Remove PC top fix bracket and scan EMC bracket. Refer to Figure 8-169.

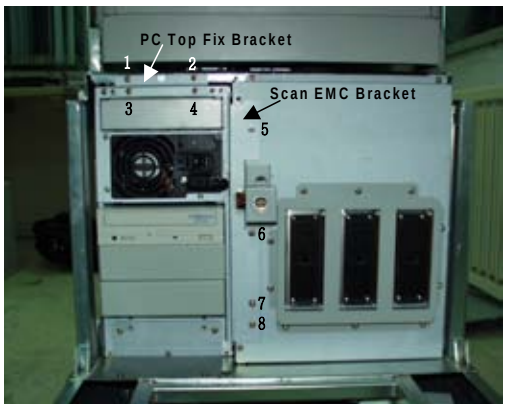


Figure 8-169 ATX SMPS Replacement

3.) Open the BEP metal cover.

4.) Disconnect all power connector from ATX smps in motherboard and hard disk and CD RW.

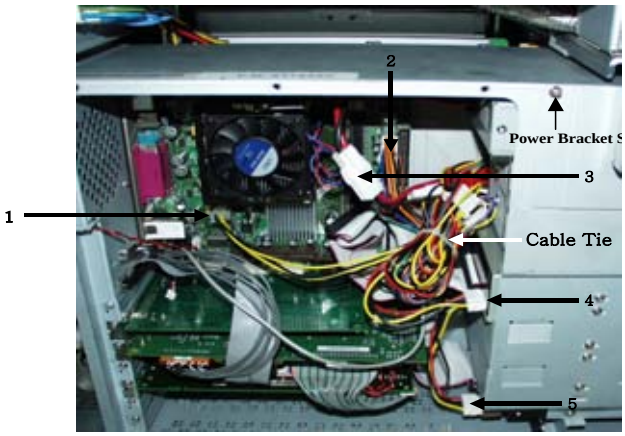


Figure 8-170 Inside of BEP

8-8-3-4 Removal Procedure (cont'd)

5.) Unscrew 2 screws on theATX power bracket.

6.) Take out the ATX smps.

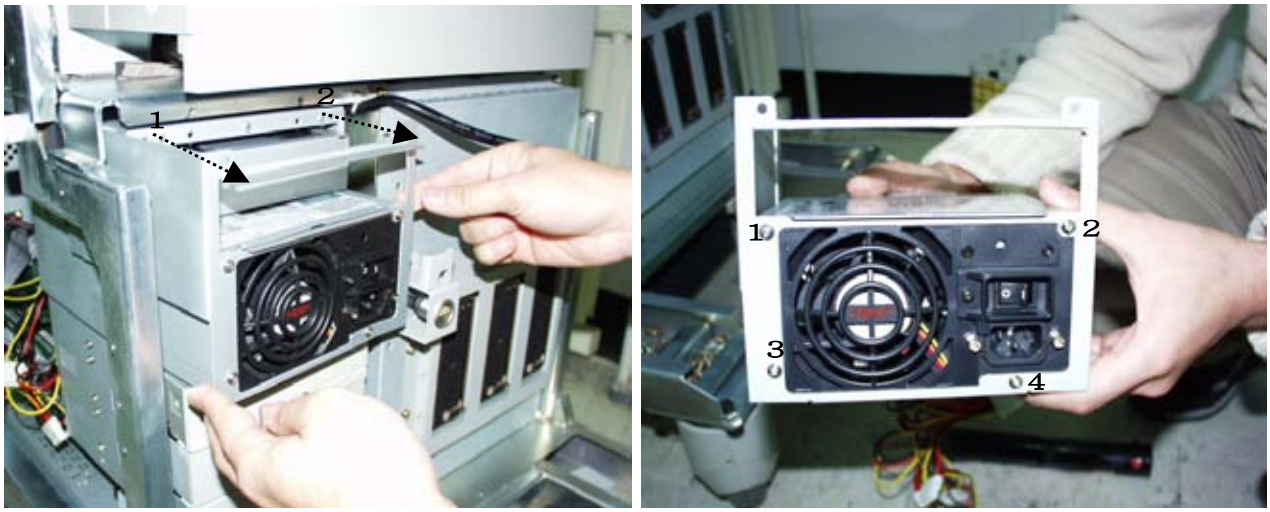


Figure 8-171 Take out the ATX SMPS

7.) To remove Hard disk and CDRW Unplug the IDE cable for HDD or CDRW drive and power connector.

8.) Unscrew the screws on the chassi for fixture.

9.) Take out CDRW or Hard disk.

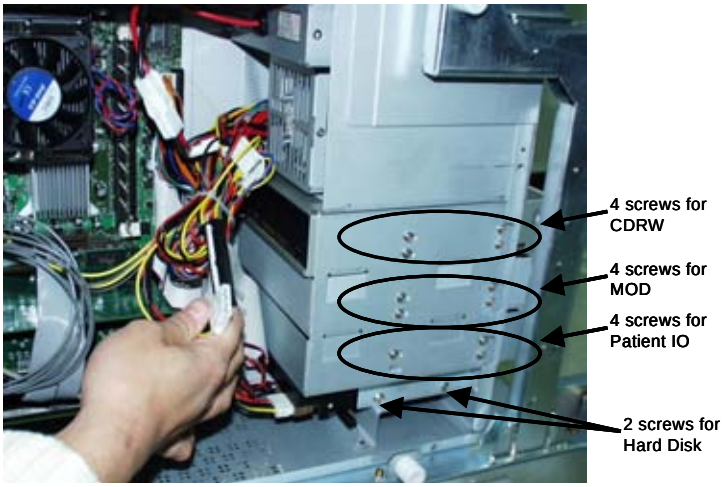


Figure 8-172 Screws for Peripheral in BEP

8-8-3-4 Removal Procedure (cont'd)

10.) Move the CDRW guide braket to new FRU.

Figure 8-173 CDRW Guide bracket

11.) Mode Jumper : Hard disk and CDRW should be set as Master drive. Confirm the mode setting jumper in hard disk and CDRW.

12.) Enter BIOS set up Mode.(Password : Jupiter)

13.) Change the Diskette configuration of the Advanced Menu Screen in the BIOS set up menu as follows.

- **Change the Diskette Controller to [Enable]**
- **Change the FLOPPYA to [Disabled]**
- **Change the Diskette Write Protect [Disabled]**

14.) Press "F10 - SAVE AND EXIT" to save the BIOS set up.

15.) Check if CD R/W is properly installed in the Maintenance Mode. (Check the CR R/W is recognized by the system in the MS windows navigator)

16.) Press and hold the Power Button for 20 sec. to execute manual system shut down.

17.) Enter BIOS Set up mode again.

18.) Reset the Diskette Controller to **[Disable]** in the Advanced Menu screen.

19.) Press "F10 - SAVE AND EXIT" to save the BIOS set up.

20.) Perform the following functional tests. If all are successful, include the debrief script provided below.

Table 8-49 Functional Tests

Service Manual Section	Functional Test / Diagnostic Test	Debrief Script
Section 4-3-1	Power On/Boot Up	"Service Manual, Direction 2300000, Rev 1+, Section 8-8-3. Equipment passed all required tests and is ready for use. "
Section 4-3-2	Power Off / Shutdown	
Section 4-9-13	SMPS, HDD, ODD Assy function check procedure	
Section 4-3-4	System B/M-Mode Checks	
Section 4-3-5	System CFM and PWD Checks	

8-8-3-5 Mounting Procedure

Install the new parts in the reverse order of removal.

8-8-3-6 Hard disk copy procedure

This section show the patient data duplication procedure for hard disk replacement The purpose od this procedure is to copy the patient data in the used hard diks into the newly installed BEP or hard disk assy.

CAUTION **If the new hard disk have the patient data, these data should be back up with CD before data copy procedure. Since the patient data will be overwritten into the new hard disk from used hard disk.**

8-8-3-6-1 Connect HDD

1.) Set the used hard disk as slave mode disk. All the HDD have jumper for mode setting, master mode or slave mode. For the patient data copy procedure, the both HDD should be set as master and slave. The HDD in the installed BEP assy is the master. All of the HDD in BEP assy are set to master in the factory. So the used HDD should be set to slave. Refer the figure of HDD jumper

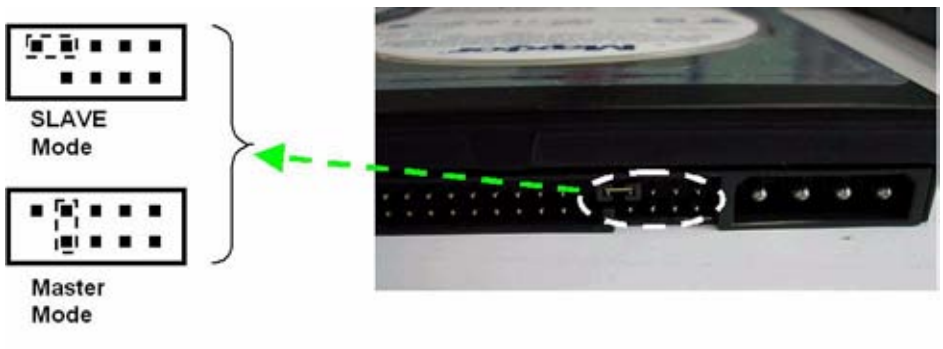


Figure 8-174 HDD Mode Setting Jumper

2.) Connect the IDE cable to HDD.

3.) The used HDD should be installed in BEP assy as slave HDD. There are 2 flat cables in the BEP assy. One is for CDRW drive or MOD and the other is for HDD. The both HDD, used one and new one should be connected through common flat cable. If the HDD cable is tied by tie wrap, cut the tie off carefully. The extra connector of HDD cable should be connected to the used HDD as Figure 8-175.

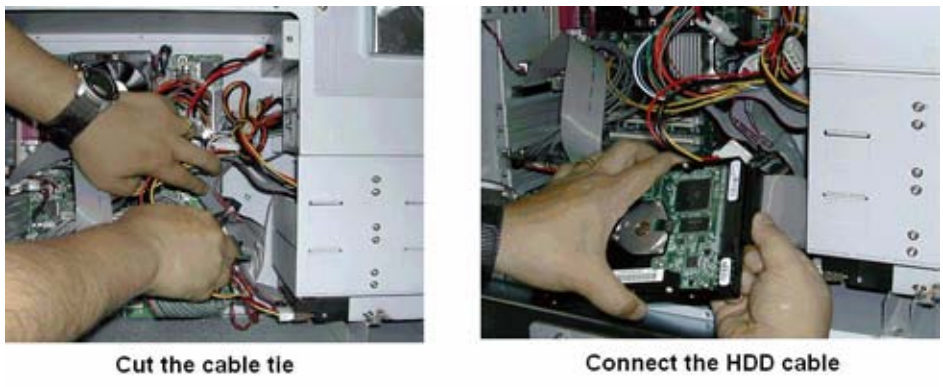


Figure 8-175 Connector HDD Cable

8-8-3-6-2 Data copy to new HDD

1.) Go into maintenance mode.

2.) Plug the USB service dongle into usb port on the rear panel. There are 2 usb ports on the rear panel. The right side USB port is recommended for service dongle. Turn on the system and key in the service password.

Maintenance Access
A username/password is required to use the maintenance features of this machine
Username:
Password:
Key expiry date:
December 31, 2050
Key serial number:
0x09584284
OK
Cancel
Features of this product are covered by one or more pervang patent applications and by one or more of the U.S. or international patents listed on the About page.

Figure 8-176 maintenance login

8-8-3-6-3 File Copy

1.) The database control software module should be disabled through task manager The task manager can be activated by following procedure.

2.) Move the cursor to right-bottom side of screen.

3.) Click the left trackball key and select task manager.

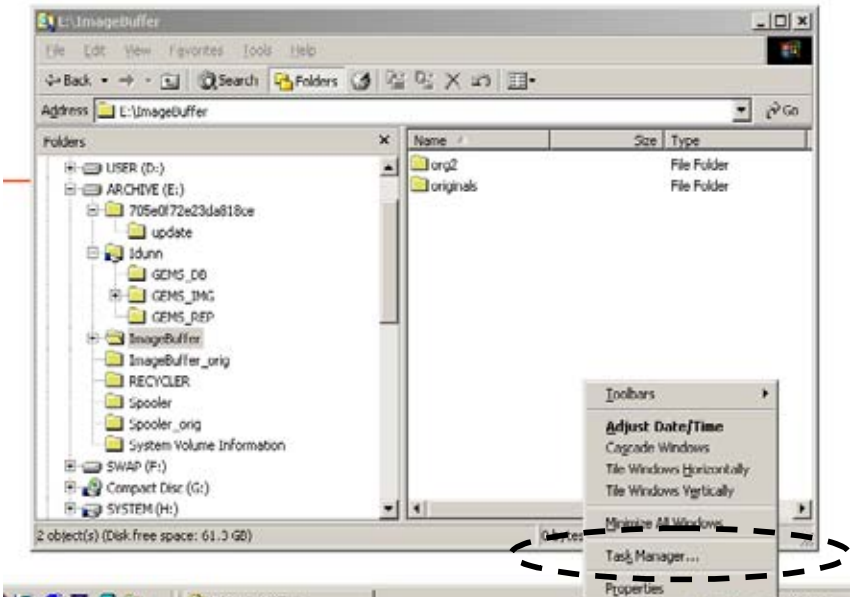


Figure 8-177 Run Task Manager

4.) Select then "process" button on the task manager window.

8-8-3-6-3 File Copy (cont'd)

5.) Select the "dbeng7.exe" in the process list and click the "End Process" button.

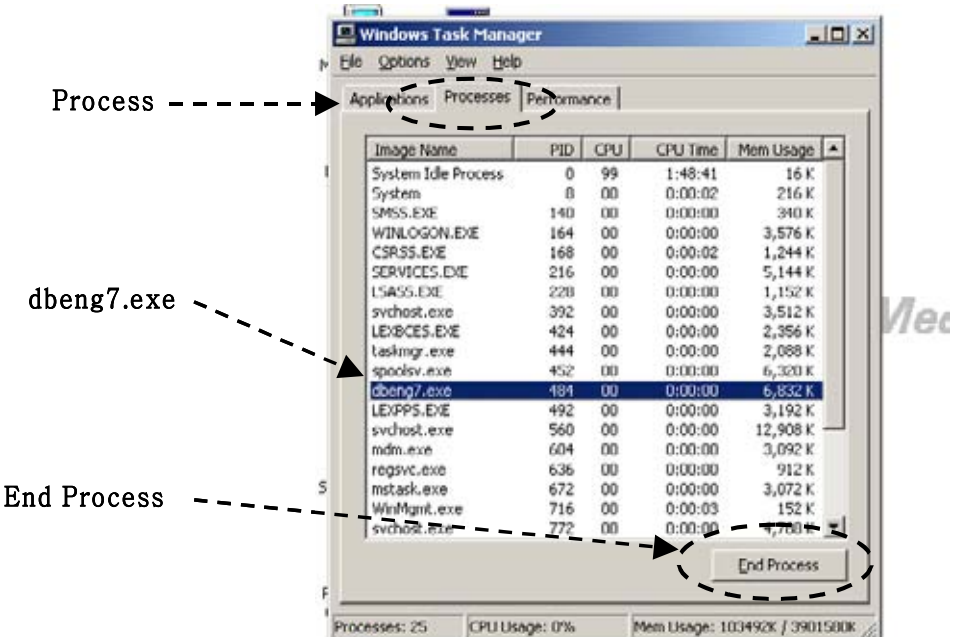

Process
dbeng7.exe
End Process
Windows Task Manager
File Options View Help
Applications Processes Performance
Image Name PID CPU CPU Time Mem Usage
System Idle Process 0 99 1:48:41 16 K
System 8 00 0:00:02 216 K
SMSS.EXE 140 00 0:00:00 340 K
WINLOGON.EXE 164 00 0:00:00 3,576 K
CSRSS.EXE 168 00 0:00:02 1,244 K
SERVICES.EXE 216 00 0:00:00 5,144 K
LSASS.EXE 228 00 0:00:00 1,152 K
svchost.exe 392 00 0:00:00 3,512 K
LEXBCES.EXE 424 00 0:00:00 2,356 K
taskmgr.exe 444 00 0:00:00 2,088 K
spoolsv.exe 452 00 0:00:00 6,320 K
dbeng7.exe 484 00 0:00:00 6,832 K
LEXPPS.EXE 492 00 0:00:00 3,192 K
svchost.exe 560 00 0:00:00 12,908 K
mdm.exe 604 00 0:00:00 3,092 K
regsvc.exe 636 00 0:00:00 912 K
mstask.exe 672 00 0:00:00 3,072 K
WinMgmt.exe 716 00 0:00:03 152 K
End Process
Processes: 25 CPU Usage: 0%

Figure 8-178 Task Manager with process

6.) click the "Yes" button when "task manager warning" dialog box .

7.) Check if windows identify the both HDD.

8.) Run the window explorer. Move the cursor to bottom of the screen and click the "window explorer" on the task bar.

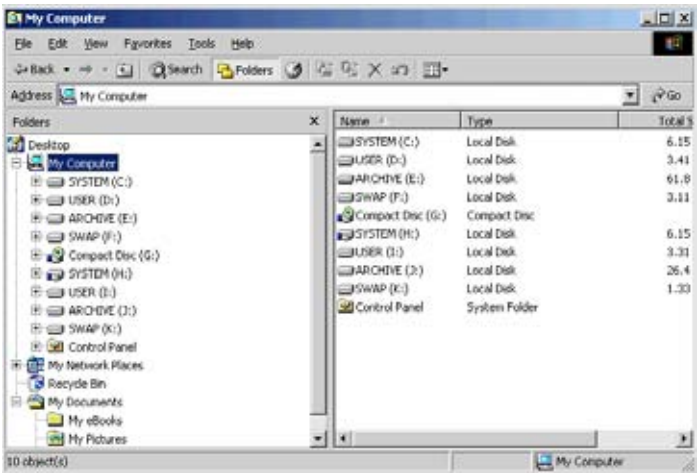


Figure 8-179 Dual Hard disk status

8-8-3-6-3 File Copy (cont'd)

9.) There should be 8 logical disk totally. Each HDD have 4 partitions, "SYSTEM", "USER", "ARCHIVE", "SWAP". The used HDD which is set to slave is "H" to "K". And the new HDD in BEP which is set to master is "C" to "F". (If the L5 system have MO drive, the slave drive number can be "I" to "L")

10.) The patient data files are in the "Idunn" directory in the "ARCHIVE" disk.

11.) All of sub directory in the "Idunn" directory of slave HDD should be copy to "Idunn" directory of master HDD. (In below example, the three sub directory "GEMS_DB", "GEMS_IMG", "GEMS_REP" in the "Idunn" directory in "J" drive should be copy to "Idunn" drive in "E" drive.)

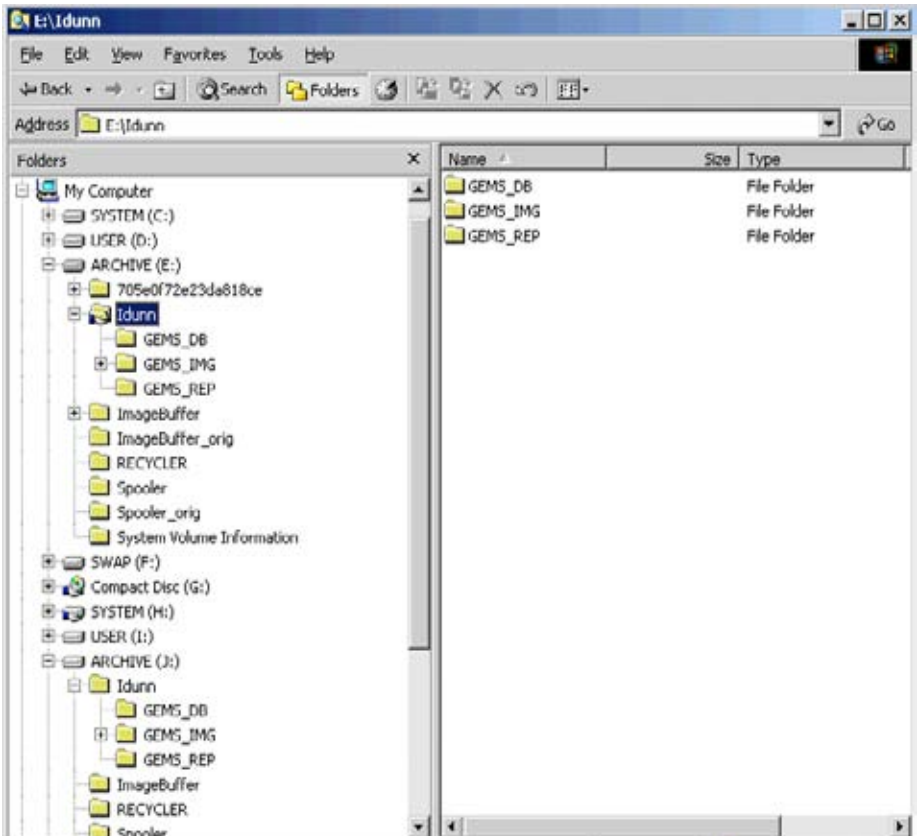


Figure 8-180 Directory Map in HDD

12.) If following warning message appear, click the button "Yes to All".

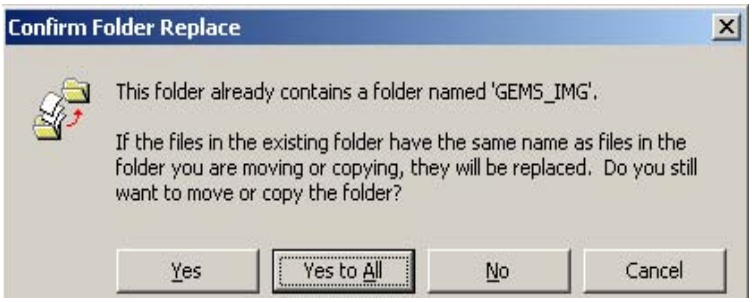

Confirm Folder Replace
This folder already contains a folder named 'GEMS_IMG'.
If the files in the existing folder have the same name as files in the folder you are moving or copying, they will be replaced. Do you still want to move or copy the folder?
Yes
Yes to All
No
Cancel

Figure 8-181 Copy confirmation message

13.) If finish the file copy process, shutdown the system and unplug the service dongle.

8-8-3-6-4 Check the patient data

1.) Turn on the system
2.) If system boot up, select patient menu and confirm that the all of patient data are available.
3.) The database utility should be enabled by the network IP address setting procedure. If this “save setting procedure have been missed, the patient data image can not be show up since the database link error

8-8-3-6-5 Shut down the system.

1.) Turn off the circuit breaker.
2.) Disconnect the slave HDD(used HDD) from HDD cable in BEP assy carefully.
3.) Close the BEP cover and all other cover.
4.) Turn on the system and boot up.
5.) Check the system operation.

Section 8-9
Power Block

8-9-1 AC Power Assy

Purpose: This is a description on how to remove and replace the AC Power Assy.

8-9-1-1 Tools

- Common pillips screwdrivers

8-9-1-2 Needed Manpower

- 2 persons, 15 minutes + travel

8-9-1-3 Preparations

- Shut Down the System and switch off the Main Breaker at the rear as described in section 4-3-2 on page 3.

8-9-1-4 Removal Procedure

CAUTION **Do not wear the ESD wrist strap when you remove a part of power supply unit. Turn OFF power and unplug the power cord before removing a part of power supply unit. However be sure to turn off power and wear the strap before you remove a circuit boards.**

1.) Unscrew two(2) screws (1-2) to remove rear connector bracket. Refer to Figure 8-182.

Figure 8-182 Removing the Rear Connector Bracket

2.) Disconnect eight (8) connectors (3-10). Refer to Figure 8-183.

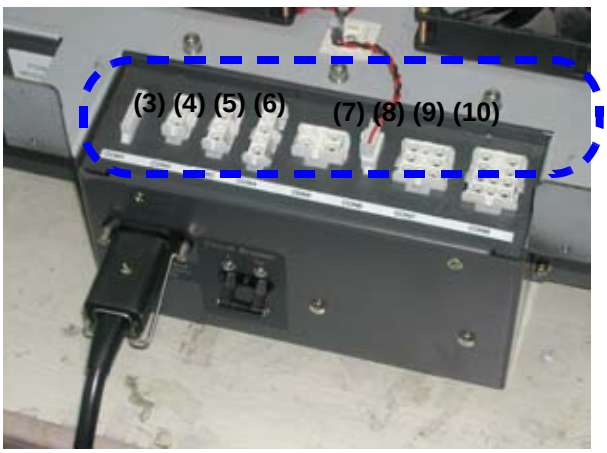


Figure 8-183 Disconnecting 8 connecotors

8-9-1-4 Removal Procedure (cont'd)

3.) Unscrew eight (8) screws (11-18) to remove AC Power assy. Refer to Figure 8-184.

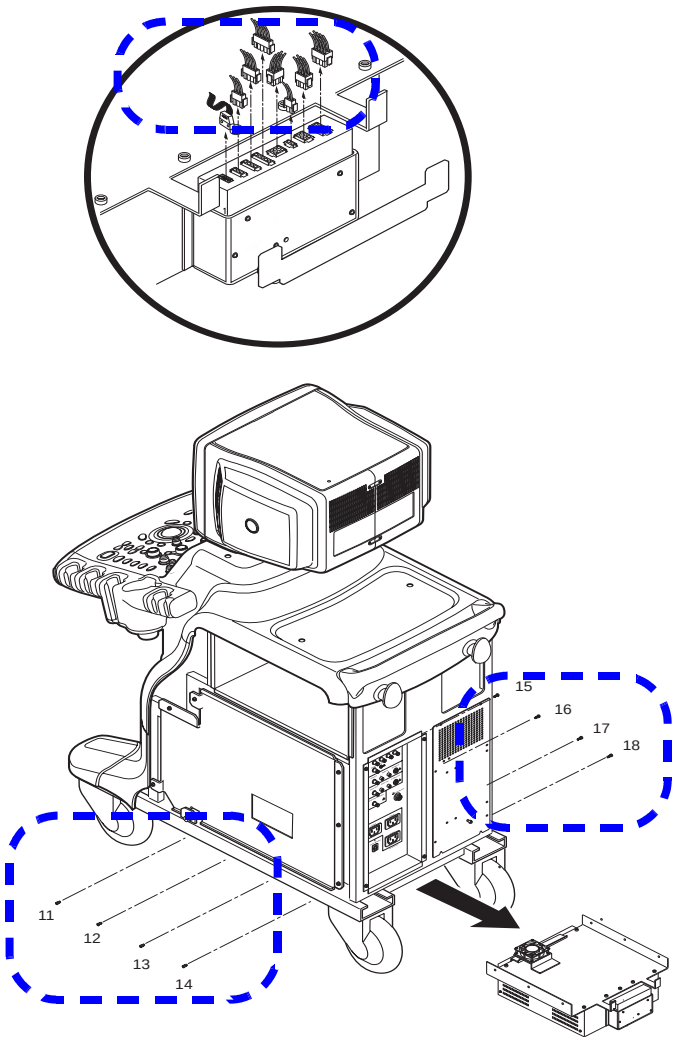


Figure 8-184 Removing the AC Power Assy

4.) Remove the AC Power Assy.

⚠ **WARNING** ***The weight of the AC Power Assy is approximately 20 kg. Two person is needed in the next step.***

8-9-1-4 Removal Procedure (cont'd)

5.) Perform the following functional tests. If all are successful, include the debrief script provided below.

Table 8-50 Functional Tests

Service Manual Section	Functional Test / Diagnostic Test	Debrief Script
Section 4-3-1	Power On/Boot Up	"Service Manual, Direction 2300000, Rev 1+, Section 8-9-1. Equipment passed all required tests and is ready for use. "
Section 4-3-2	Power Off / Shutdown	
Section 4-9-15	AC Power Assy function check procedure.	
Section 4-3-4	System B/M-Mode Checks	
Section 4-3-5	System CFM and PWD Checks	

8-9-1-5 Mounting Procedure

Install the new parts in the reverse order of removal.

8-9-2 LV Unit

Purpose: This is a description on how to remove and replace the LV Unit.

8-9-2-1 Tools

- Common pillips screwdrivers
- Allen/Unbraco wrench
- Long-nose gripper

8-9-2-2 Needed Manpower

- 1 person, 15 minutes + travel

8-9-2-3 Preparations

- Shut Down the System and switch off the Main Breaker at the rear as described in section 4-3-2 on page 3.

8-9-2-4 Removal Procedure

CAUTION **Do not wear the ESD wrist strap when you remove a part of power supply unit. Turn OFF power and unplug the power cord before removing a part of power supply unit. However be sure to turn off power and wear the strap before you remove a circuit boards.**

NOTE: LV Unit can be removed without disassembling AC Power Assy.

1.) Unscrew four (4) screws (1-4) to remove Left side cover of AC Power assy.
2.) Disconnect three (3) connectors (5-7) from the rear side of the LV Unit. Refer to Figure 8-185.

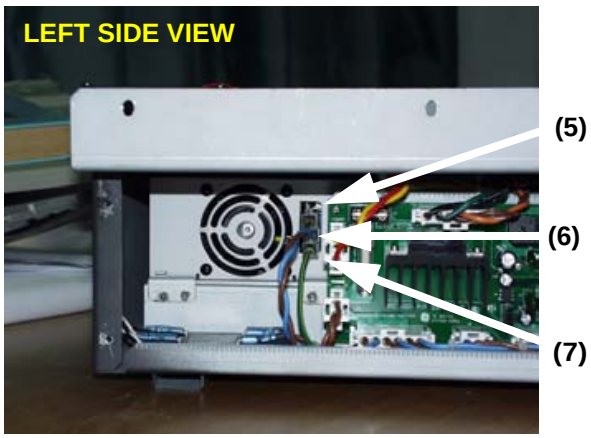


Figure 8-185 Disconnect 3 connectors

3.) Unscrew four (4) screws (8-11) to remove Right side cover of AC Power assy.

8-9-2-4 Removal Procedure (cont'd)

4.) Unscrew four (4) screws (12-15) and disconnect twenty (20) connectors from the front side of the LV unit using long-nose gripper. Refer to Figure 8-186.

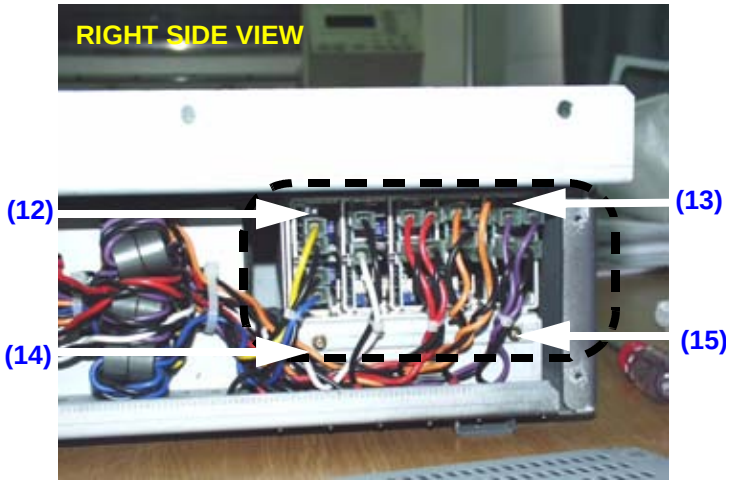


Figure 8-186 Unscrew 4 screws and disconnect 20 connectors

5.) Remove the LV unit.

6.) Perform the following functional tests. If all are successful, include the debrief script provided below.

Table 8-51 Functional Tests

Service Manual Section	Functional Test / Diagnostic Test	Debrief Script
Section 4-3-1	Power On/Boot Up	"Service Manual, Direction 2300000, Rev 1+, Section 8-9-2. Equipment passed all required tests and is ready for use. "
Section 4-3-2	Power Off / Shutdown	
Section 4-9-16	LV Unit function check procedure	
Section 4-3-4	System B/M-Mode Checks	
Section 4-3-5	System CFM and PWD Checks	

8-9-2-5 Mounting Procedure

Install the new parts in the reverse order of removal.

8-9-3 JPC Assy

Purpose: This is a description on how to remove and replace the JPC Assy.

8-9-3-1 Tools

- Common pillips screwdrivers
- Allen/Unbraco wrench

8-9-3-2 Needed Manpower

- 1 person, 15 minutes + travel

8-9-3-3 Preparations

- Shut Down the System and switch off the Main Breaker at the rear as described in section 4-3-2 on page 3.

8-9-3-4 Removal Procedure

CAUTION **Do not wear the ESD wrist strap when you remove a part of power supply unit. Turn OFF power and unplug the power cord before removing a part of power supply unit. However be sure to turn off power and wear the strap before you remove a circuit boards.**

1.) Unscrew nine (9) hexagon screws (1-9) to remove the AC Power Top cover.
2.) Unscrew five (5) screws (10-14).

JPC Assy

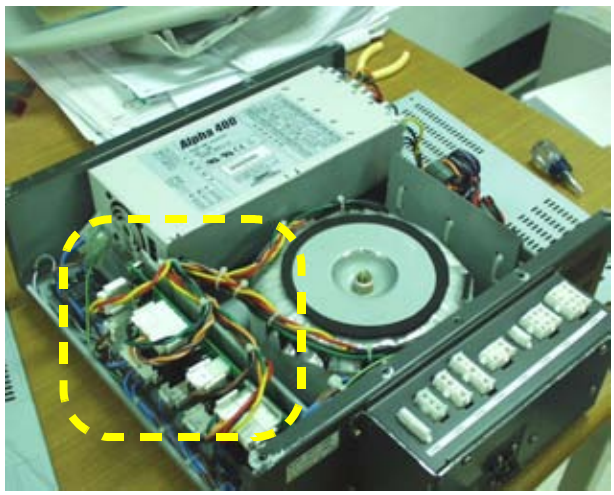


Figure 8-187 JPC Assy

8-9-3-4 Removal Procedure (cont'd)

3.) Disconnect all the connectors connected in the JPC Assy. Refer to Figure 8-188.

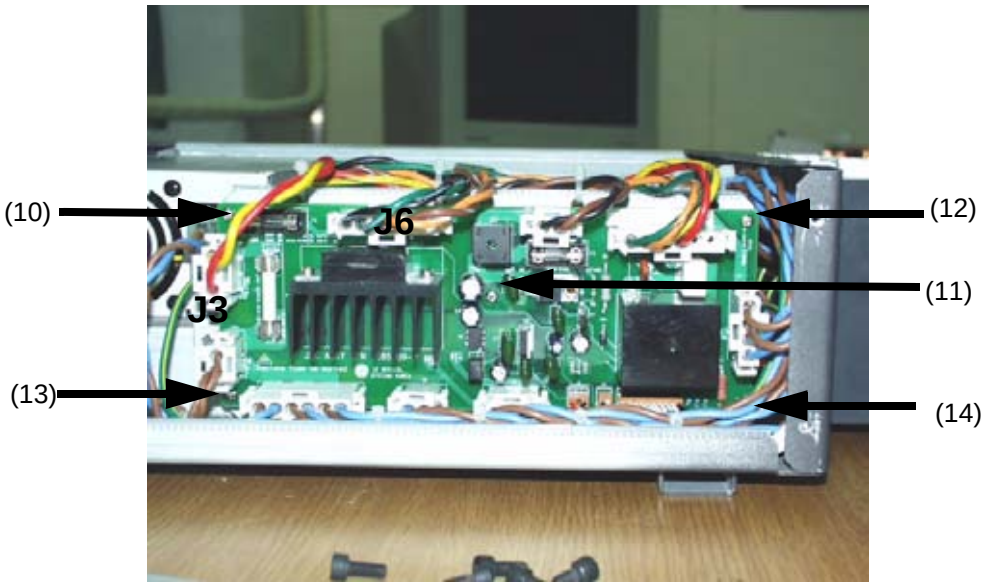


Figure 8-188 Disconnecting all connectors

4.) Remove the JPC Assy.

5.) Perform the following functional tests. If all are successful, include the debrief script provided below.

Table 8-52 Functional Tests

Service Manual Section	Functional Test / Diagnostic Test	Debrief Script
Section 4-3-1	Power On/Boot Up	"Service Manual, Direction 2300000, Rev 1+, Section 8-9-3. Equipment passed all required tests and is ready for use. "
Section 4-3-2	Power Off / Shutdown	
Section 4-9-17	JPC function check procedure	
Section 4-3-4	System B/M-Mode Checks	
Section 4-3-5	System CFM and PWD Checks	

8-9-3-5 Mounting procedure

Case1 Replacing JPC with JPC

Replacing JPC2 with JPC2

Install the new parts in the reverse order

Case2 Replace JPC with JPC2

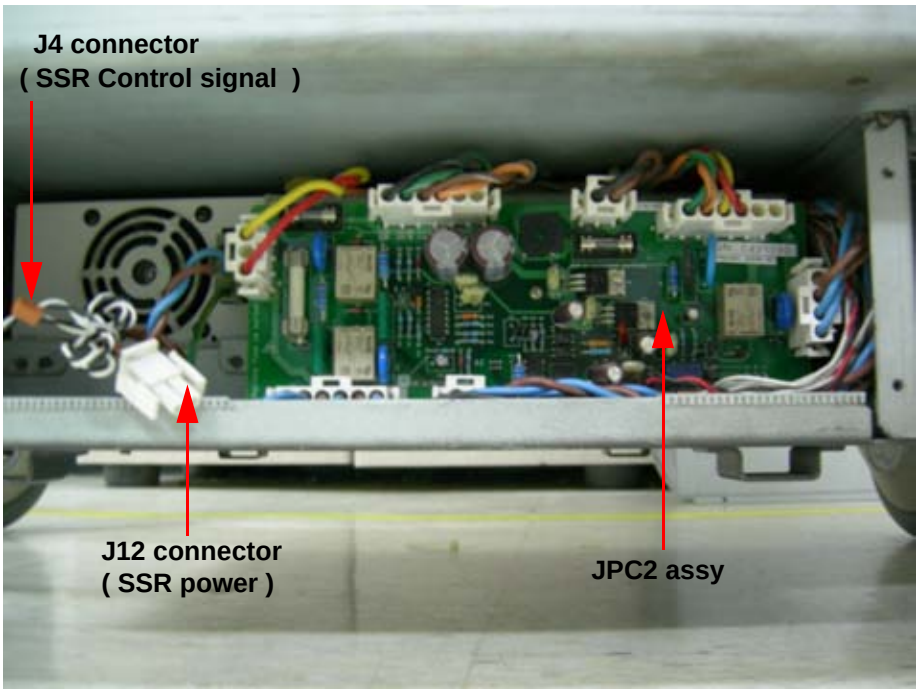


Figure 8-189 JPC2 ASSY installation

CAUTION **J4 and J12 are not used with the JPC2, since JPC2 Assay has Relay instead of SSR and it does not have to connect J4 (SSR control connector), J12 (SSR power) to JPC2.**

8-9-4 Transformer

Purpose: This is a description on how to remove and replace the Transformer.

8-9-4-1 Tools

- Common pillips screwdrivers
- Allen/Unbraco wrench

8-9-4-2 Needed Manpower

- 1 person, 15 minutes + travel

8-9-4-3 Preparations

- Shut Down the System and switch off the Main Breaker at the rear as described in section 4-3-2 on page 3.

8-9-4-4 Removal Procedure

CAUTION **Do not wear the ESD wrist strap when you remove a part of power supply unit. Turn OFF power and unplug the power cord before removing a part of power supply unit. However be sure to turn off power and wear the strap before you remove a circuit boards.**

1.) Remove the AC Power top cover. Refer to section 8-9-1 on page 153.
2.) Remove the AC Power left cover. Refer to section 8-9-1 on page 153.
3.) Disconnect four (4) connectors (1-4, J3, J6, J9, J11). Refer to Figure 8-190.

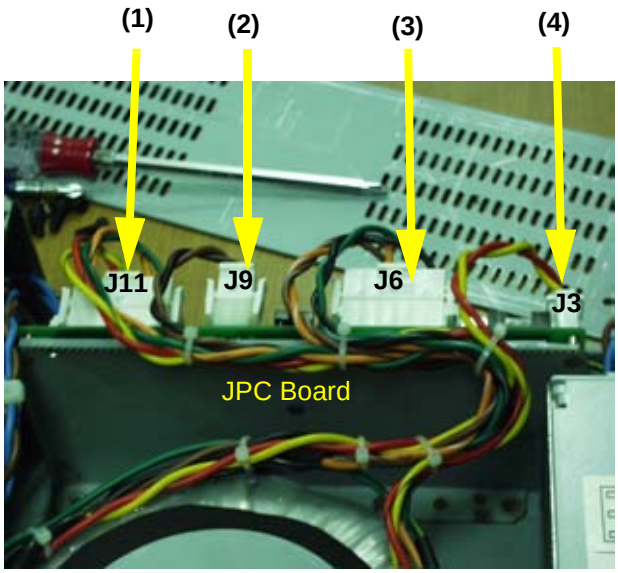


Figure 8-190 Disconnecting 4 connectors

4.) Cut the Cable ties tied to the cables.
5.) Disassemble the AC Power box cover. Refer to section 8-9-5 on page 163.

8-9-4-4 Removal Procedure (cont'd)

6.) Unscrew four (4) ground screws (5-8). Refer to Figure 8-191.

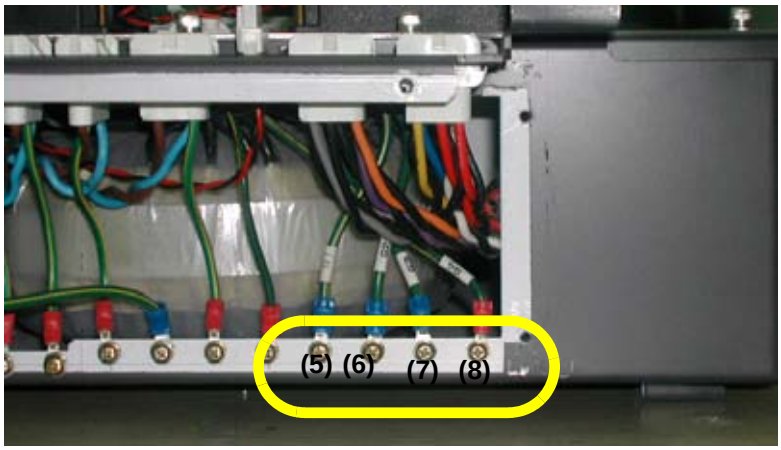


Figure 8-191 Unscrew 4 screws

7.) Unscrew one nut in the Center top of the Transformer. Refer to Figure 8-192.

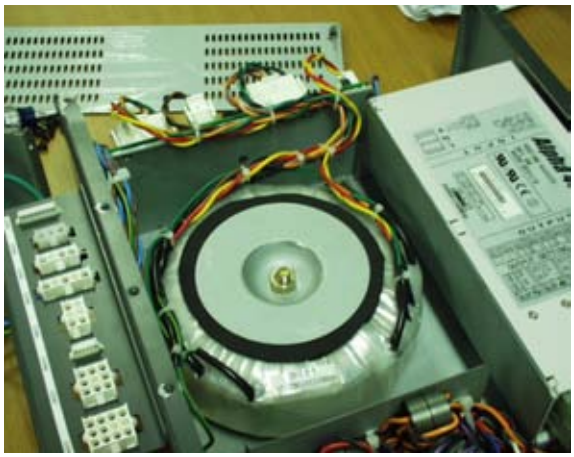


Figure 8-192 Removing the Transformer

8.) Remove the Transformer Assy.

9.) Perform the following functional tests. If all are successful, include the debrief script provided below.

Table 8-53 Functional Tests

Service Manual Section	Functional Test / Diagnostic Test	Debrief Script
Section 4-3-1	Power On/Boot Up	"Service Manual, Direction 2300000, Rev 1+, Section 8-9-4. Equipment passed all required tests and is ready for use. "
Section 4-3-2	Power Off / Shutdown	
Section 4-9-18	Transformer function check procedure	
Section 4-3-4	System B/M-Mode Checks	
Section 4-3-5	System CFM and PWD Checks	

8-9-4-5 Mounting Procedure

Install the new parts in the reverse order of removal.

8-9-5 AC Power Box

Purpose: This is a description on how to remove and replace the AC Power Box.

8-9-5-1 Tools

- Common pillips screwdrivers
- Allen/Unbraco wrench

8-9-5-2 Needed Manpower

- 1 person, 15 minutes + travel

8-9-5-3 Preparations

- Shut Down the System and switch off the Main Breaker at the rear as described in section 4-3-2 on page 3.
- AC Power Assy should be removed before proceed. Refer to AC POWER ASSY DISASSEMBLY on section 8-9-1 on page 153.

8-9-5-4 Removal Procedure

CAUTION **Do not wear the ESD wrist strap when you remove a part of power supply unit. Turn OFF power and unplug the power cord before removing a part of power supply unit. However be sure to turn off power and wear the strap before you remove a circuit boards.**

1.) Unscrew six screws (1-6) and remove the AC Power Box cover. Refer to Figure 8-193.

Figure 8-193 Unscrew 6 screws to remove AC Power Box

2.) Remove the AC Power left side cover.

8-9-5-4 Removal Procedure (cont'd)

3.) Disconnect one (1) connector (J1) from the JPC Assy. Refer to Figure 8-194.

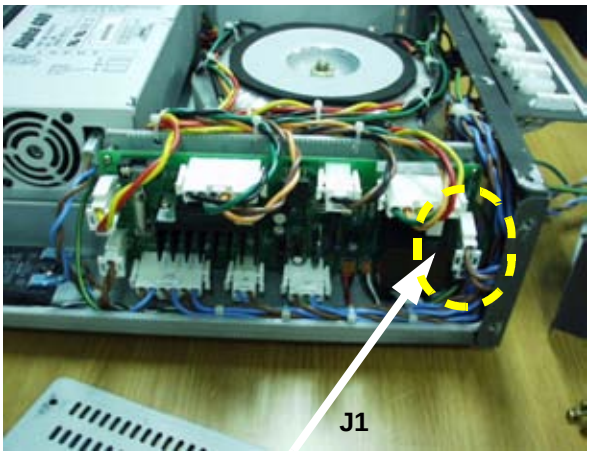


Figure 8-194 Disconnect 1 connector

4.) Unscrew two (2) ground screws (7-8). Refer to Figure 8-195.

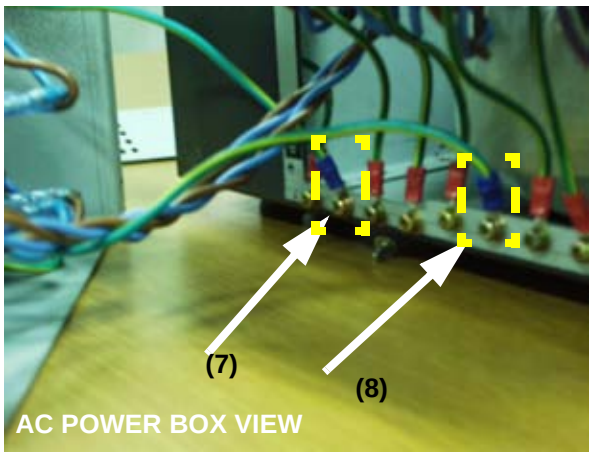


Figure 8-195 Unscrew two ground screws

5.) Remove the AC Power Box.

6.) Perform the following functional tests. If all are successful, include the debrief script provided below.

Table 8-54 Functional Tests

Service Manual Section	Functional Test / Diagnostic Test	Debrief Script
Section 4-3-1	Power On/Boot Up	"Service Manual, Direction 2300000, Rev 1+, Section 8-9-5. Equipment passed all required tests and is ready for use. "
Section 4-3-2	Power Off / Shutdown	
Section 4-9-19	AC Power Box function check procedure	
Section 4-3-4	System B/M-Mode Checks	
Section 4-3-5	System CFM and PWD Checks	

8-9-5-5 Mounting Procedure

Install the new parts in the reverse order of removal.

8-9-6 Fuse Set

Purpose: This is a description on how to remove and replace the Fuse Set.

8-9-6-1 Tools

- Common pillips screwdrivers
- Allen/Unbraco wrench

8-9-6-2 Needed Manpower

- 1 person, 15 minutes + travel

8-9-6-3 Preparations

- Shut Down the System and switch off the Main Breaker at the rear as described in section 4-3-2 on page 3.

8-9-6-4 Removal Procedure

CAUTION **Do not wear the ESD wrist strap when you remove a part of power supply unit. Turn OFF power and unplug the power cord before removing a part of power supply unit. However be sure to turn off power and wear the strap before you remove a circuit boards.**

NOTE: Fuses can be removed without disassembling AC Power Assy.

1.) Unscrew four (4) screws (1-4) to remove Left side cover of AC Power assy.
2.) Remove the Fuses. Refer to Figure 8-196.

Figure 8-196 Removing the Fuse

3.) Perform the following functional tests. If all are successful, include the debrief script provided below.

Table 8-55 Functional Tests

Service Manual Section	Functional Test / Diagnostic Test	Debrief Script
Section 4-3-1	Power On/Boot Up	"Service Manual, Direction 2300000, Rev 1+, Section 8-9-6. Equipment passed all required tests and is ready for use. "
Section 4-3-2	Power Off / Shutdown	
Section 4-9-20	Fuse set function check procedure	
Section 4-3-4	System B/M-Mode Checks	
Section 4-3-5	System CFM and PWD Checks	

8-9-6-5 Mounting Procedure

Install the new parts in the reverse order of removal.

Section 8-10
Software Loading Procedure

8-10-1 General

This describes a full system software loading (Base Software Load Image + LOGIQ 5 Application) procedure.

Use this instruction when:

- Performing the HDD with new one (Base Software Load Image + Application)

- Performing the system revision-up (Application)

Reference : The below is the support table between Application Software version and Base System Software Load Image part number

Table 8-56 Base Software Load Image CD Part Numbers

Application Software Version	Base Software Load Image Part P/N	
	5134559-x (BEP2)	5132191-x (BEP3)
R4.X.X	Supported	Supported

8-10-2 Parts Required

Base System Software Load Image CD

LOGIQ 5 R4.x.x Application Software

Blank CD-R (for patient image backup)

Service Dongle

NOTE: Patient Image Data will be deleted when all the drives are ghosted. Back up them on the CD-R or MOD before starting software loading

NOTE: Insert the service dongle into ths service port located at the rear panel before installing the Base System Software Load image

8-10-3 TimeRequired

Approximately 2 hour

8-10-4 Software Loading Steering Guide

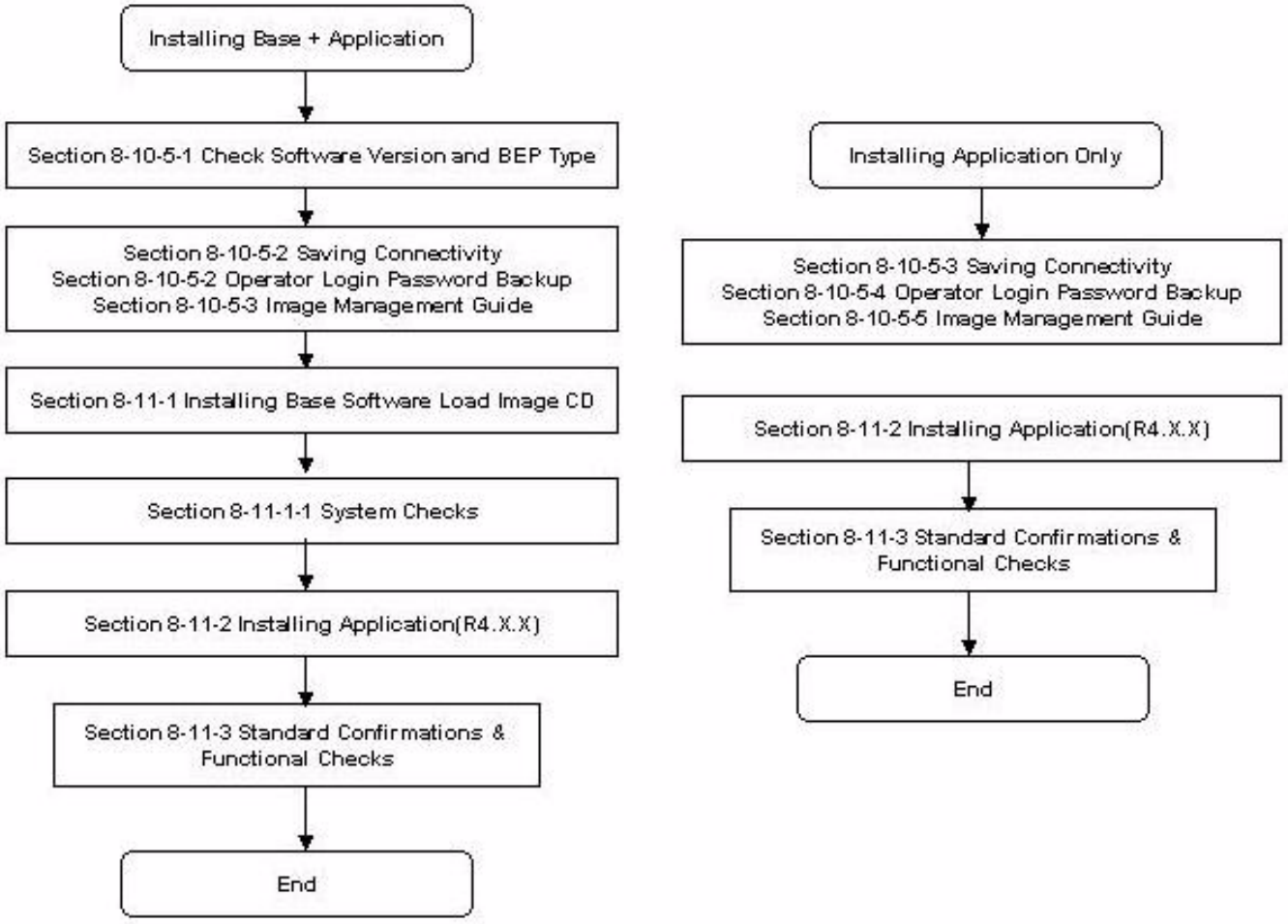

Installing Base + Application
Section 8-10-5-1 Check Software Version and BEP Type
Section 8-10-5-2 Saving Connectivity
Section 8-10-5-2 Operator Login Password Backup
Section 8-10-5-3 Image Management Guide
Section 8-11-1 Installing Base Software Load Image CD
Section 8-11-1-1 System Checks
Section 8-11-2 Installing Application(R4.X.X)
Section 8-11-3 Standard Confirmations & Functional Checks
End
Installing Application Only
Section 8-10-5-3 Saving Connectivity
Section 8-10-5-4 Operator Login Password Backup
Section 8-10-5-5 Image Management Guide
Section 8-11-2 Installing Application(R4.X.X)
Section 8-11-3 Standard Confirmations & Functional Checks
End

Figure 8-197 Flow Chart - Installation of Base and Application CD

8-10-5 Before Starting Software Loading

8-10-5-1 Check Software Version and BEP Type

1.) Turn ON the system.

2.) Touch the Utility button on the Touch Panel

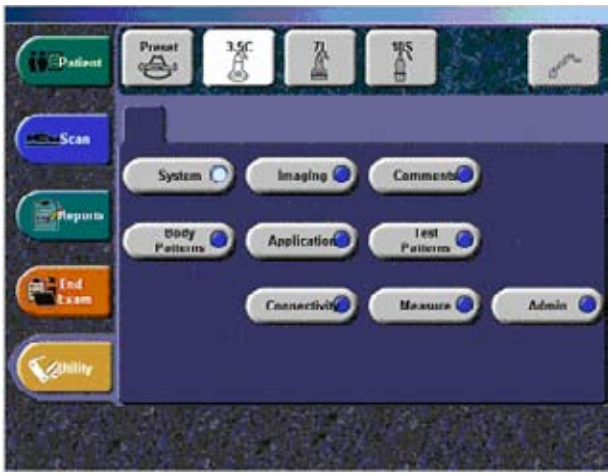


Figure 8-198 Touch the Utility

NOTE: Operator Login Window appears. Select adm(Administrator) for the Operator field. Adm(Administrator) will be shown in the Operator field as default. Enter password which is configured already (or the password might not be necessary). Then click on Log on.

Figure 8-199 Operator Login Window

3.) Touch the Utility button on the Touch Panel.

4.) Click on About tab.

5.) Check Image Part Number is **2377598 or 2393964** or 5134559 and 5132191 then confirm BEP type. Refer to Table 8-57 on page 168.

Table 8-57 BEP Type

Image Part Number	BEP Type
2377598-2 or later	BEP2 and 40GB HDD
2393964-x or 5134559-x	BEP2 and 80GB HDD
5132191-x	BEP3

8-10-5-1 Check Software Version and BEP Type (cont'd)

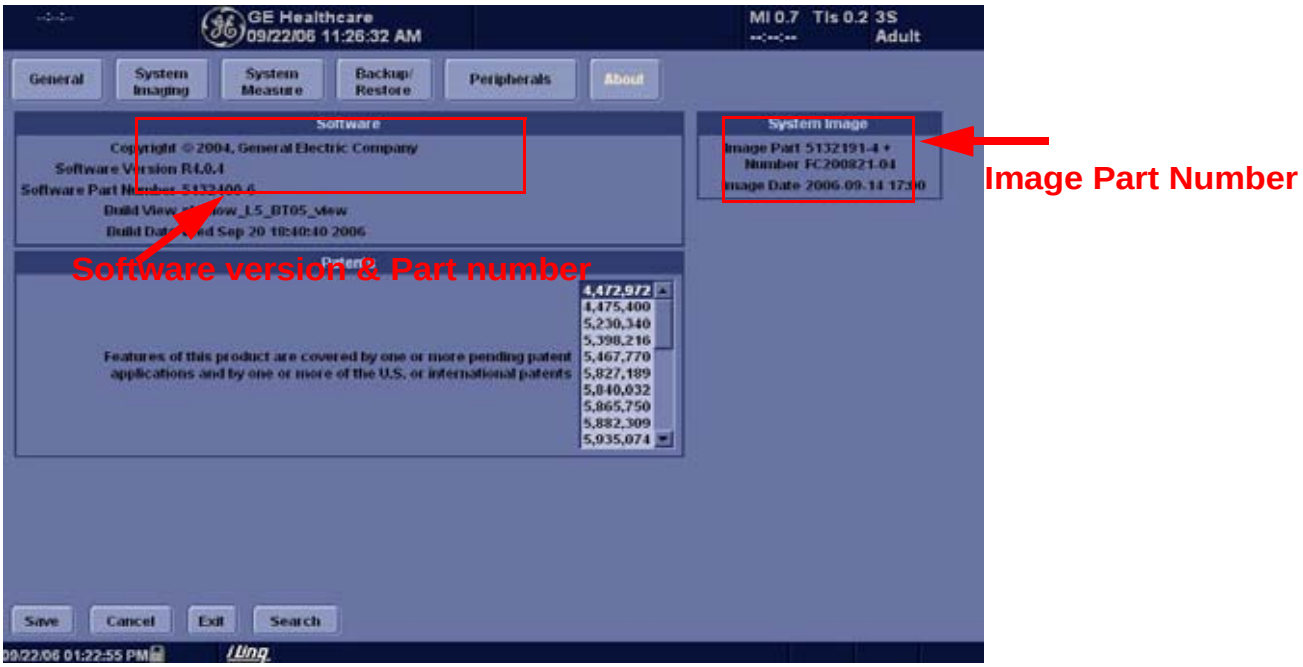
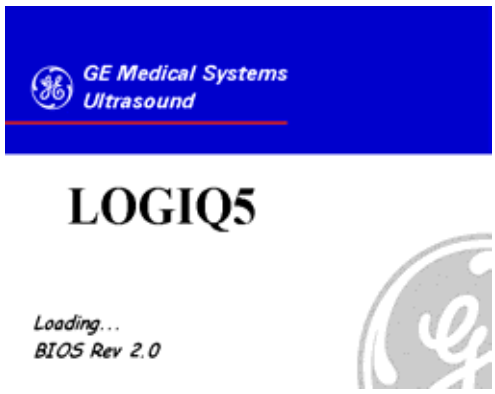
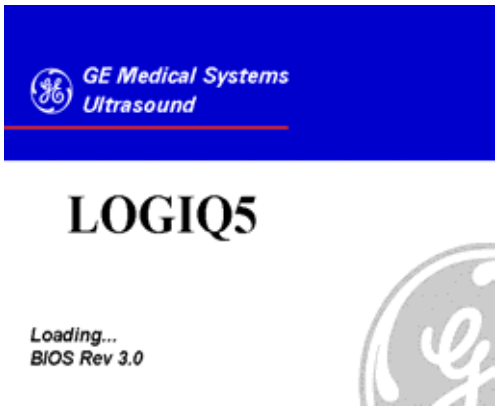
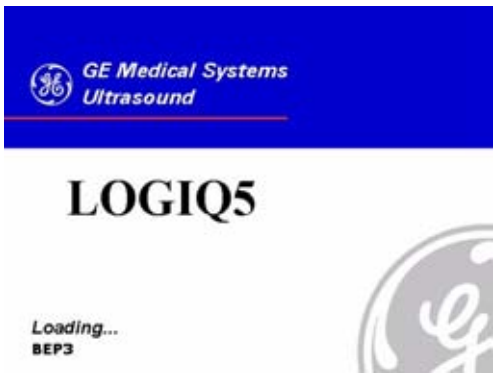


Figure 8-200 Check BEP Type and Software Version

8-10-5-2 Check BEP Type with BIOS Boot Logo Image

NOTE: On booting the system, BIOS Boot Logo Image shows which BEP type is used.

BEP Type	Boot Logo Image
BEP2 (2377598)	
BEP2 (2393964)	
BEP3 (5132191)	

8-10-5-3 Saving Connectivity

Before starting upgrade, write down the **Connectivity Setting** for back-up.

1.) Touch **Utility > Connectivity** on the touch panel and click the **Tcpip** tab.

2.) Write down the following parameters:

Parameters	Descriptions (Entry for Stand-Alone System)
Computer Name	
Enable DHCP	
IP-Address	
Subnet Mask	
Default Gateway	
Remote Archive IP-Addr	
Remote Archive Name	
Note : For a stand-alone system, preset values of IP address, subnet mask, and default gateway, shown above, must entered.	

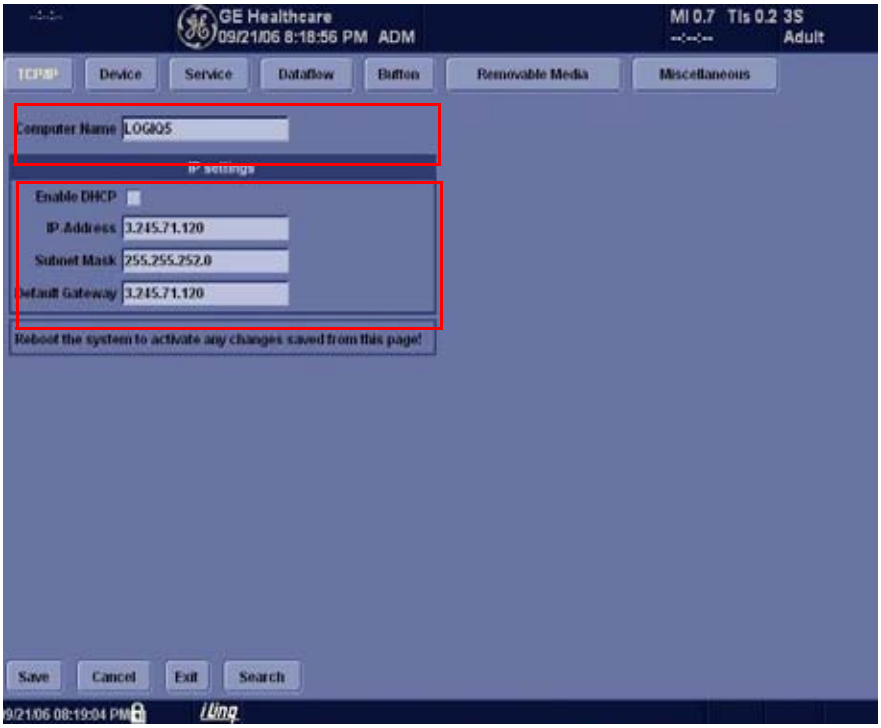


Figure 8-201 Connectivity

8-10-5-4 Operator Login Password Back-up

The Operator Login Password will be deleted. So, write down the password if necessary.

Figure 8-202 Operator Login

Parameters	Descriptions
Operator Login Password	

8-10-5-5 Image Management Guide

NOTE: Before upgrading to R4.x.x software, performe a recommended image backup procedure.

Save As to View on any PC - Use this to save images (Dicom or Raw Dicom) in a computer-friendly format (.avi or .jpeg) so you can view it on any PC.

Export/Import Data/Images Between Systems - Use this to copy both patient data and images for specified patient(s) from one system to another.

Save As (Saving Images to CD-ROM to View on Any PC)

To save images to the CD-ROM:

1.) Insert the CD.
2.) Go to Utility --> Connectivity --> Tools(Removable Media instead of Tools in case of BTO5 SW) Select the Media as CD Rewritable.
3.) Press Format to format the CD-ROM.
4.) Select the image(s) to be saved to CD-ROM, press Menu, and select Save As.

8-10-5-5 Image Management Guide (cont'd)

5.) The SAVE AS menu appears.

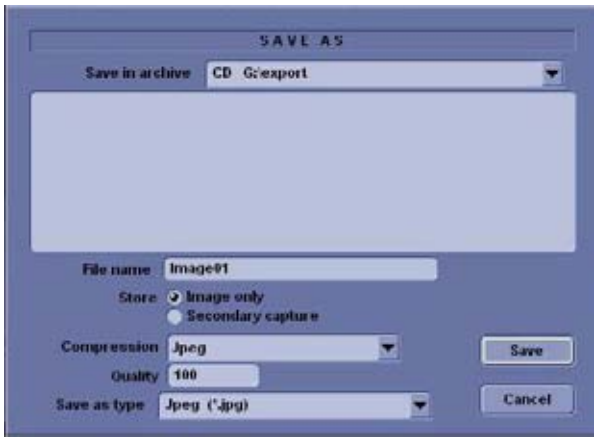


Figure 8-203 Save As Menu

6.) Specify Compression and Save As Type and press Save. The image is saved to the CD-ROM.

7.) When you have put all the images you want on the CD, press F3 to eject the CD-ROM. Select CD Rewritable.

Figure 8-204 Eject Media Menu

8.) Finalize the CD-ROM by selecting Yes. The CD-ROM is ejected from the system.

Figure 8-205 Finalize CD-ROM Menu

8-10-5-5 Image Management Guide (cont'd)

Storing Images with More Resolution

To store images with more resolution than is available with the JPEG selection, select Save As and select AVI as the Save As Type. You can save single images as .avi files.

Table 8-58 Higher Resolution Store Options

Image Type	Store as Image Only	Store as Secondary Capture
CINE Loop	Gives you a loop of just the image (no title bar and scan information).	Gives you a single image of the video area. DO NOT DO THIS BECAUSE YOU DO NOT KNOW WHICH IMAGE FROM THE LOOP THAT YOU ARE GETTING.
Still Image	Gives you a single image (no title bar and scan information).	Gives you a single image of the video area.

Export/Import (Moving Data Between Ultrasound Systems)

To move exams from one Ultrasound system to another, you need to export/import exam information.

NOTE: Both database information and images are exported. No data is deleted from the local archive when exporting data.

Exporting Data

To export an exam(s) to a compatible Ultrasound system:

1.) Format the removable media (MOD or CD-ROM). Label the removable media. Answer Yes/OK to the messages.Press Patient. Deselect any selected patient(s) in the search portion of the Patient screen. Press Exam Data Transfer (located at the upper, left-hand corner of the Patient menu).

Figure 8-206 Exam Data Transfer

2.) Select Export task Button.

Figure 8-207 Task button

8-10-5-5 Image Management Guide (cont'd)

3.) The [From] combo box is not active. It displays Local Archive. The [To] combo box is active. Select the type of removable media MOD or CD Rom. Then please wait until the patient list is visible.

Figure 8-208 To Combo Box

4.) In the patient list at the top of the Patient menu, select the patient(s) you want to export. You can use Windows commands to select more than one patient. To select a consecutive list of patients, click the cursor on the first name, move the cursor to the last name, then press and hold down the Shift+right Set key to select all the names.To select a non-consecutive list of patients, click the cursor at the first name, move the cursor to the next name, then press and hold down the Ctrl+right Set key, move the cursor to the next name, then press and hold down the Ctrl+right Set key again, etc.You can also search for patients via the Search key and string. Or, Select All Button from the Patient Menu:

Figure 8-209 Source Section

NOTE: You need to use your best judgment when moving patients' images. If there are lots of images or loops, then only move a few patients at a time.

5.) Once you have selected all of the patients to export, press Transfer Button as shown inFigure 8-68 on page 8-119 from the Patient Menu.

8-10-5-5 Image Management Guide (cont'd)

6.) The progress bar appears as the copy is taking place. Once transfer completed, the exported patient list will be shown as Figure 8-210.

Figure 8-210 Destination Section of Patient Screen

7.) Press F3 to eject the media. Specify that you want to finalize the CD-ROM.

Importing Data

To import an exam(s) to another Ultrasound system:

1.) At the other Ultrasound system, insert the MOD or CD-ROM.

2.) Press Patient. Press Exam Data Transfer (located at the upper, left-hand corner of the Patient menu)..

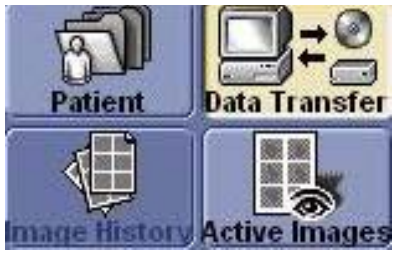


Figure 8-211 Exam Data Trnasfer

3.) Select Import task Button.

Figure 8-212 Task button

8-10-5-5 Image Management Guide (cont'd)

4.) The [TO] combo box is not active. It displays Local Archive. The [FROM] combo box is active. Select the type of removable media MOD or CD Rom. Then please wait until the patient list is visible.

Figure 8-213

5.) The Patient menu just shows the patients available for import from the removable media you just loaded onto the system.

6.) Select the patients to be imported.

7.) Once you have selected all of the patients to import, press Transfer Button as shown in Figure 8-69 on page 8-119 from the Patient Menu.

8.) Please wait for the patient information to be copied to this Ultrasound system. Progress bar appears while the import is taking place.

Section 8-11
Installing Base Software Load Image

8-11-1 Installing Base Software Load Image CD

NOTE: While we do not believe it is necessary, It would not hurt to disconnect the system from the network and remove all transducers.

1.) Power ON the scanner.

2.) Tap gently the **DEL** key until the following screen appears.Enter **jupiter** as a password if the system request a password, then press the **Enter** key.

Figure 8-214 Enter Current Password

3.) The Setup Utility screen appears. Using arrow keys, Select **Advanced** Tab and select **USB Configuration** and then press the **Enter** key. Verify that **High-Speed USB** is **Enabled**. If it is disabled, using arrow keys, select **High-Speed USB** and press the **Enter** key and change it

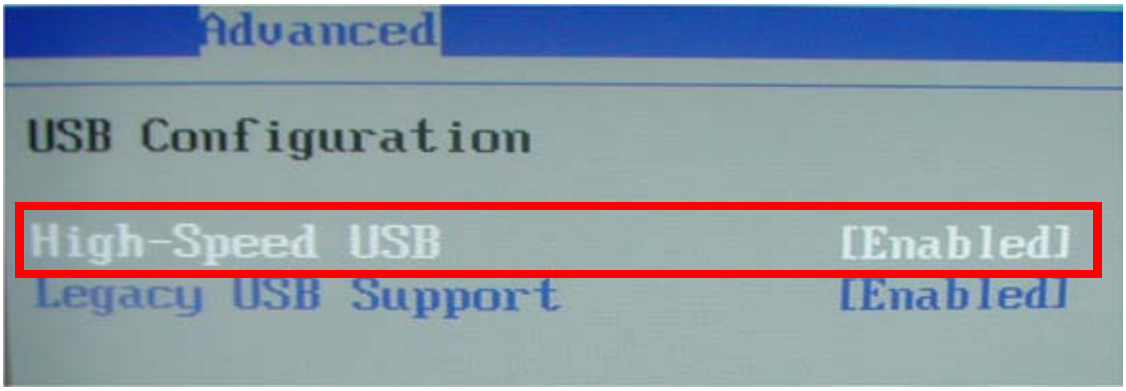


Figure 8-215 USB Configuration

4.) To exit USB Configuration, press ESC key.

8-11-1 Installing Base Software Load Image CD (cont'd)

5.) Using arrow keys, Select **Advanced** Tab and select **Chipset Configuration** and then press the Enter key. Verify that **ISA Enable Bit** is **Disabled**. If it is enabled, using arrow keys, select **ISA Enable Bit** and press the **Enter** key and Change it

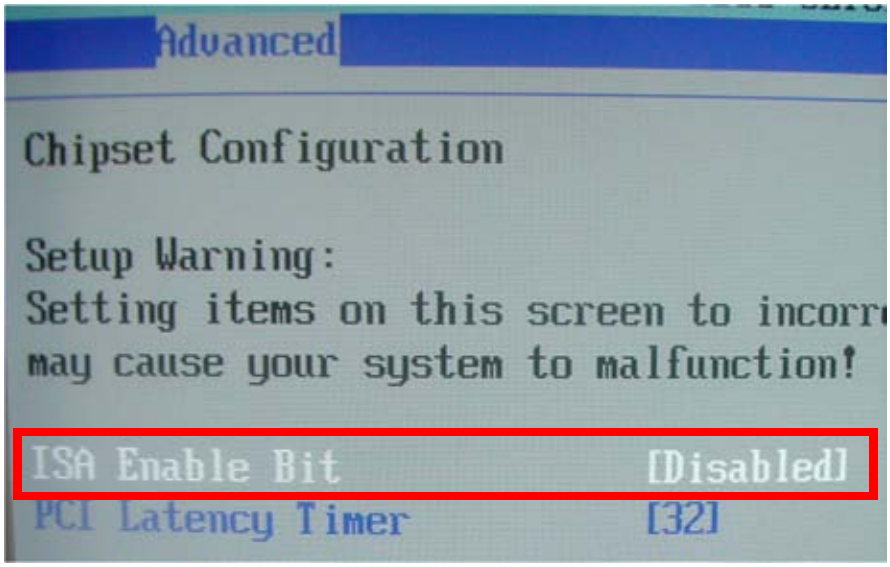


Figure 8-216 Chipset Configuration

6.) To exit Chipset Configuration, press ESC key

7.) Using arrow keys, select **Boot** and **Boot Device Priority.** Verify that **CDROM** is selected as a **First Boot Device.**

8.) If it is not, select **First Boot Device** and press the **Enter** key using arrow keys. Then select **CDROM** and press the **Enter** key

8-11-1 Installing Base Software Load Image CD (cont'd)

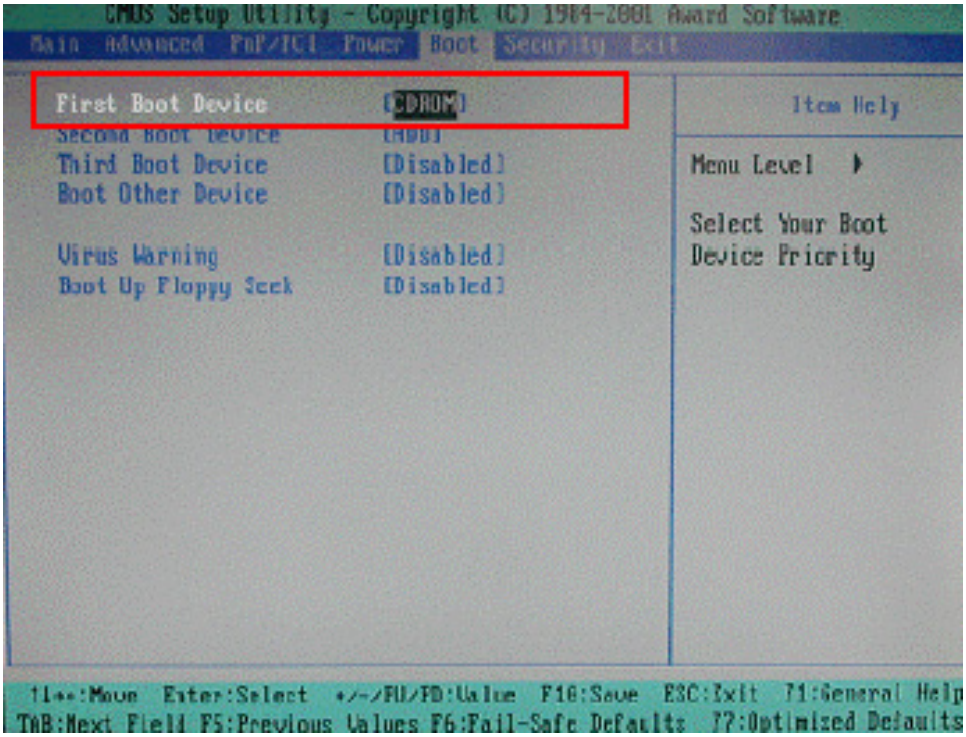

CMOS Setup Utility - Copyright (C) 1984-2001 Award Software
Main Advanced PnP/PCI Power Boot Security Exit
First Boot Device [CDROM]
Second Boot Device [HDD]
Third Boot Device [Disabled]
Boot Other Device [Disabled]
Virus Warning [Disabled]
Boot Up Floppy Seek [Disabled]
Item Help
Menu Level ▶
Select Your Boot Device Priority
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
TAB:Next Field F5:Previous Values F6:Fail-Safe Defaults F7:Optimized Defaults

Figure 8-217 First Boot Device to CD ROM for BEP2

NOTE: If the system is BEP3, select 1st Boot Device to 4M-HL-DT-ST-GCE-8526B

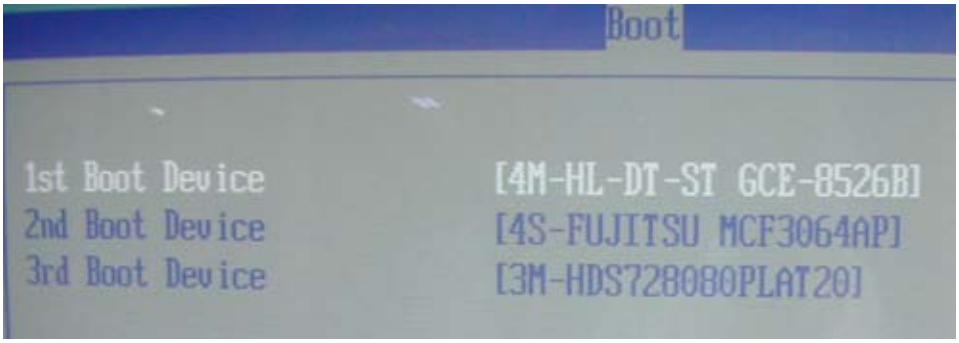


Figure 8-218 1st Boot Device to 4M-HL-DT-ST-GCE-8526B

9.) Press the **ESC** key to return to the Setup Utility screen.

10.) Using arrow keys, select **Exit & Exit Saving Change** and press the **Enter** key.

8-11-1 Installing Base Software Load Image CD (cont'd)

11.) Insert the disk labeled **"Base System Software Load Image Disk 1 of 2"** into the CDROM drive.

12.) After restarting the system, when the following screen appears, press the **Enter** key to continue, to abort remove the CD-ROM from the drive and press **CTRL-C**.

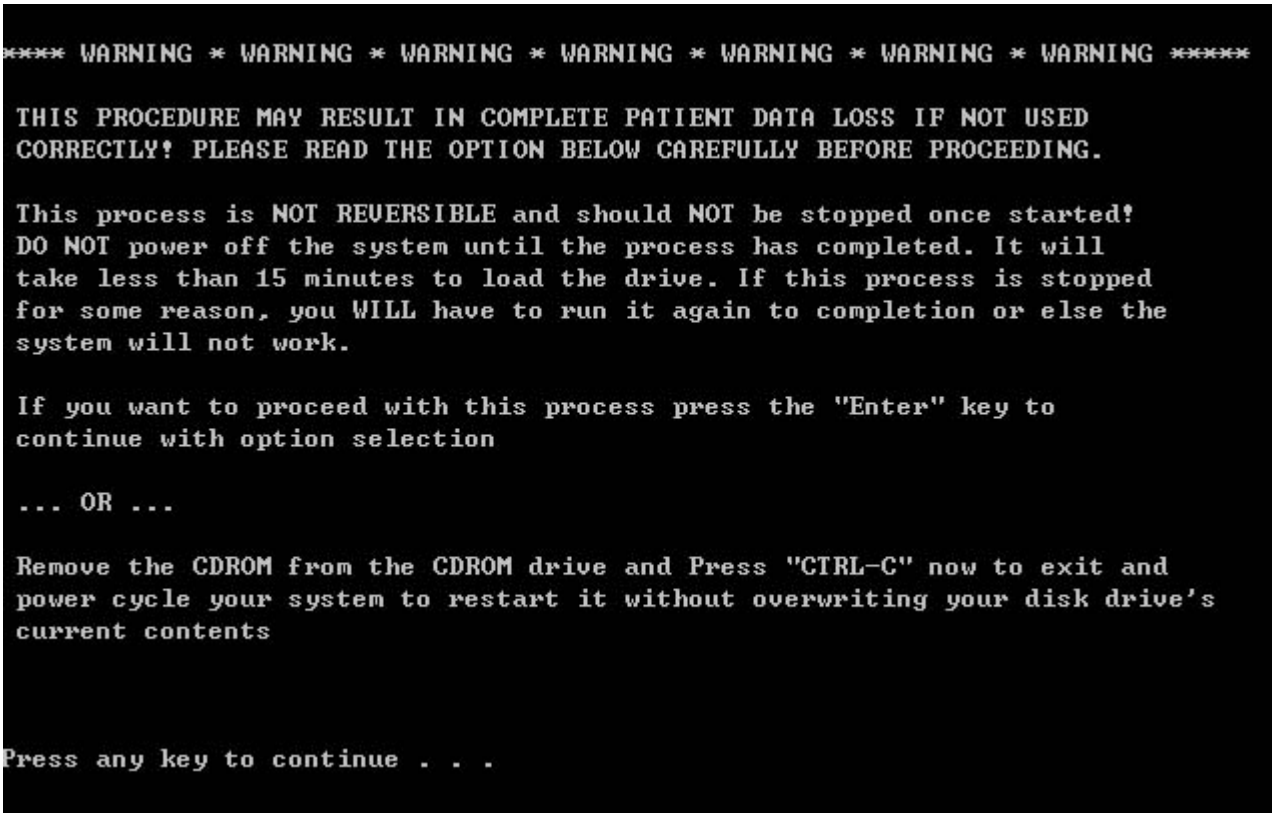

***** WARNING * WARNING * WARNING * WARNING * WARNING * WARNING * WARNING *****
THIS PROCEDURE MAY RESULT IN COMPLETE PATIENT DATA LOSS IF NOT USED
CORRECTLY! PLEASE READ THE OPTION BELOW CAREFULLY BEFORE PROCEEDING.
This process is NOT REVERSIBLE and should NOT be stopped once started!
DO NOT power off the system until the process has completed. It will
take less than 15 minutes to load the drive. If this process is stopped
for some reason, you WILL have to run it again to completion or else the
system will not work.
If you want to proceed with this process press the "Enter" key to
continue with option selection
... OR ...
Remove the CDROM from the CDROM drive and Press "CTRL-C" now to exit and
power cycle your system to restart it without overwriting your disk drive's
current contents
Press any key to continue . . .

Figure 8-219 Warning Screen

8-11-1 Installing Base Software Load Image CD (cont'd)

13.) The following screen appears.

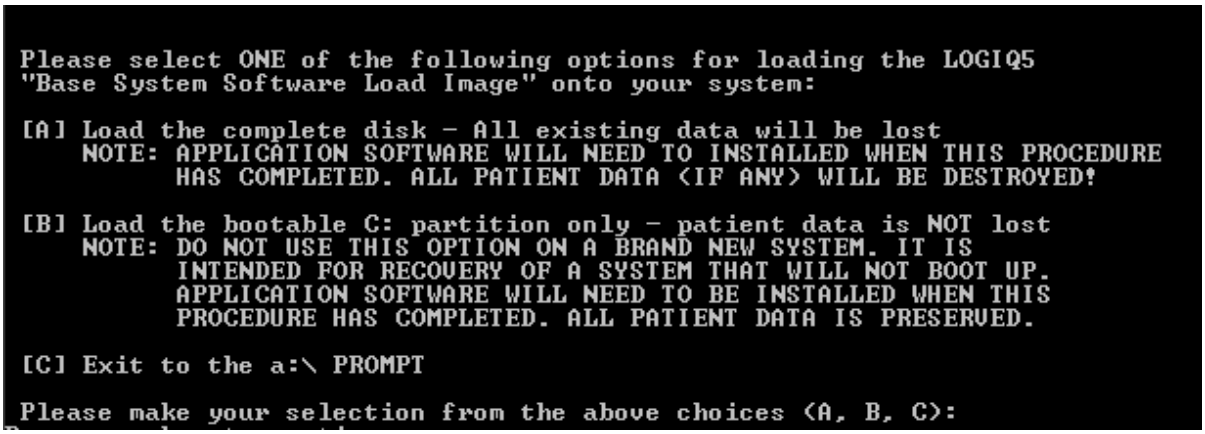

Please select ONE of the following options for loading the LOGIQ5
"Base System Software Load Image" onto your system:
[A] Load the complete disk - All existing data will be lost
NOTE: APPLICATION SOFTWARE WILL NEED TO INSTALLED WHEN THIS PROCEDURE
HAS COMPLETED. ALL PATIENT DATA (IF ANY) WILL BE DESTROYED!
[B] Load the bootable C: partition only - patient data is NOT lost
NOTE: DO NOT USE THIS OPTION ON A BRAND NEW SYSTEM. IT IS
INTENDED FOR RECOVERY OF A SYSTEM THAT WILL NOT BOOT UP.
APPLICATION SOFTWARE WILL NEED TO BE INSTALLED WHEN THIS
PROCEDURE HAS COMPLETED. ALL PATIENT DATA IS PRESERVED.
[C] Exit to the a:\ PROMPT
Please make your selection from the above choices (A, B, C):

Figure 8-220 Selection Screen

14.) If you choose 'A', you will be asked to press 'Y' to confirm your selection.

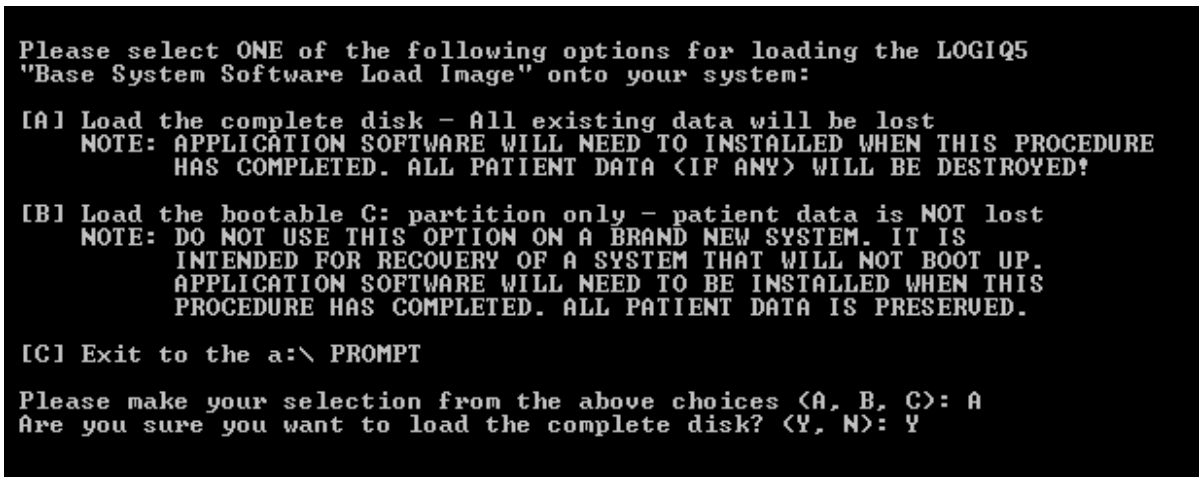

Please select ONE of the following options for loading the LOGIQ5
"Base System Software Load Image" onto your system:
[A] Load the complete disk - All existing data will be lost
NOTE: APPLICATION SOFTWARE WILL NEED TO INSTALLED WHEN THIS PROCEDURE
HAS COMPLETED. ALL PATIENT DATA (IF ANY) WILL BE DESTROYED!
[B] Load the bootable C: partition only - patient data is NOT lost
NOTE: DO NOT USE THIS OPTION ON A BRAND NEW SYSTEM. IT IS
INTENDED FOR RECOVERY OF A SYSTEM THAT WILL NOT BOOT UP.
APPLICATION SOFTWARE WILL NEED TO BE INSTALLED WHEN THIS
PROCEDURE HAS COMPLETED. ALL PATIENT DATA IS PRESERVED.
[C] Exit to the a:\ PROMPT
Please make your selection from the above choices (A, B, C): A
Are you sure you want to load the complete disk? (Y, N): Y

Figure 8-221 Confirm Screen

⚠ **NOTICE** Select **A** when installing the new HDD (BEP replacement).
Select **B** when replacing C:\Partition only. It means all customer data are NOT deleted. The Ghost procedure is performed with data of the drives D, E, and F left.

Table 2-59 Drive Partition

Drive Partition	Usage
C	System Files and Application
D	User Defined and Preset
E	Patient Archive data
F	Swap

NOTE: For versions of software R3.x.x, your presets will be automatically translated (carried forward) when the R3.0.0 software is loaded onto your system. Therefore, you DO NOT have to load your R3.X.X after the upgrade to R4.X.X softwaree

8-11-1 Installing Base Software Load Image CD (cont'd)

15.). Approx. ten (10) minutes later, the gray colored screen appears. Eject the **" Base Software Load Image CD Disk 1 of 2 "** from the drive and Insert the " **Base Software Load Image CD Disk 2 of 2"**. And then Select to 'OK' button to continue.

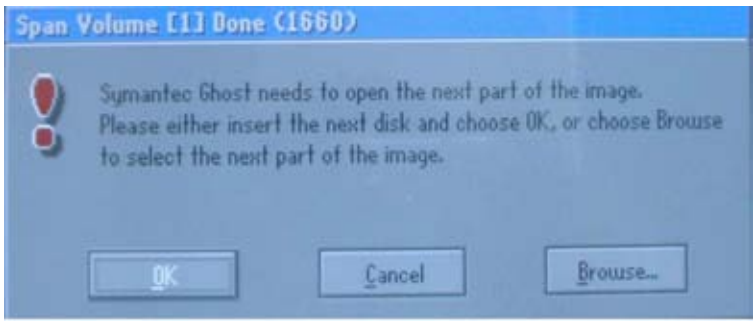

Span Volume [1] Done (1660)
Symantec Ghost needs to open the next part of the image.
Please either insert the next disk and choose OK, or choose Brouse
to select the next part of the image.
OK
Cancel
Brouse...

Figure 8-222 Span Volume [1] Done

16.) Approx. ten(10) minutes later, the following screen appears. Eject the**" Base Software Load Image CD 2 of 2"** from the drive

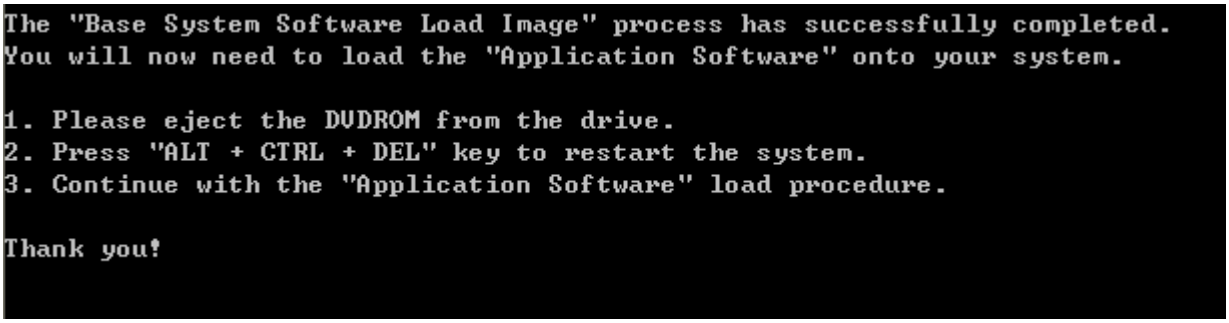

The "Base System Software Load Image" process has successfully completed.
You will now need to load the "Application Software" onto your system.
1. Please eject the DVDROM from the drive.
2. Press "ALT + CTRL + DEL" key to restart the system.
3. Continue with the "Application Software" load procedure.
Thank you!

Figure 8-223 Screen

17.) After removing the CDROM from the drive, Press ALT + CTRL + DEL key

18.) Turn on the system.

NOTE: After installation Base Software Load Image CDs, the "General failure reading drive A .. Abort, Retry, Fail?" message can be appeared, but Ignore it! All procedure would be successfully done

NOTE: Remove the CD-ROM from the drive. Otherwise you will be repeating the Base System Software Load process.

8-11-1-1 System Checks

1.) Approx. two minutes later, the windows XP desktop appears. Then one minutes later, the following screen appears. Clisck on **Yes** using right button of the trackball to restart the system

System Settings Change
Windows has finished installing new devices. The software that supports your device requires that you restart your computer.You must restart your computer before the new settings will take effect.
Do you want to restart your computer now?
Yes
No

Figure 8-224 System Setting Change

NOTE: If the window above is not displayed, go to next step

2.) Drive Letter Checks:

a.) Double click on My Computer

b.) First check to see if you need to change the drive letters on the CDROM drive and the Magneto Optical drives – they **SHOULD** be G: and H: respectively.If they are, go to next step 3.) Driver Checks

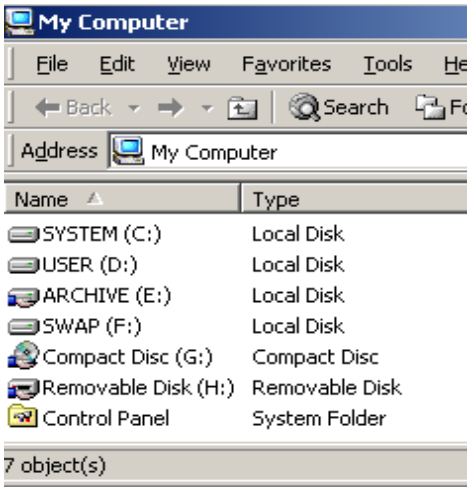


Figure 8-225 My Computer

8-11-1-1 System Checks (cont'd)

c.) Right-Click on the "My Computer" icon on the Windows desktop. Select "Manage" you should see a screen like below. Then left click on the driver assigned currently to G:, right click on **Change Drive Letter and Path**

NOTE: In case of BTO5, left-click on the "Start" button, then go to "Settings"->"Control Panel"->"Administrative Tools"->"Computer Management"

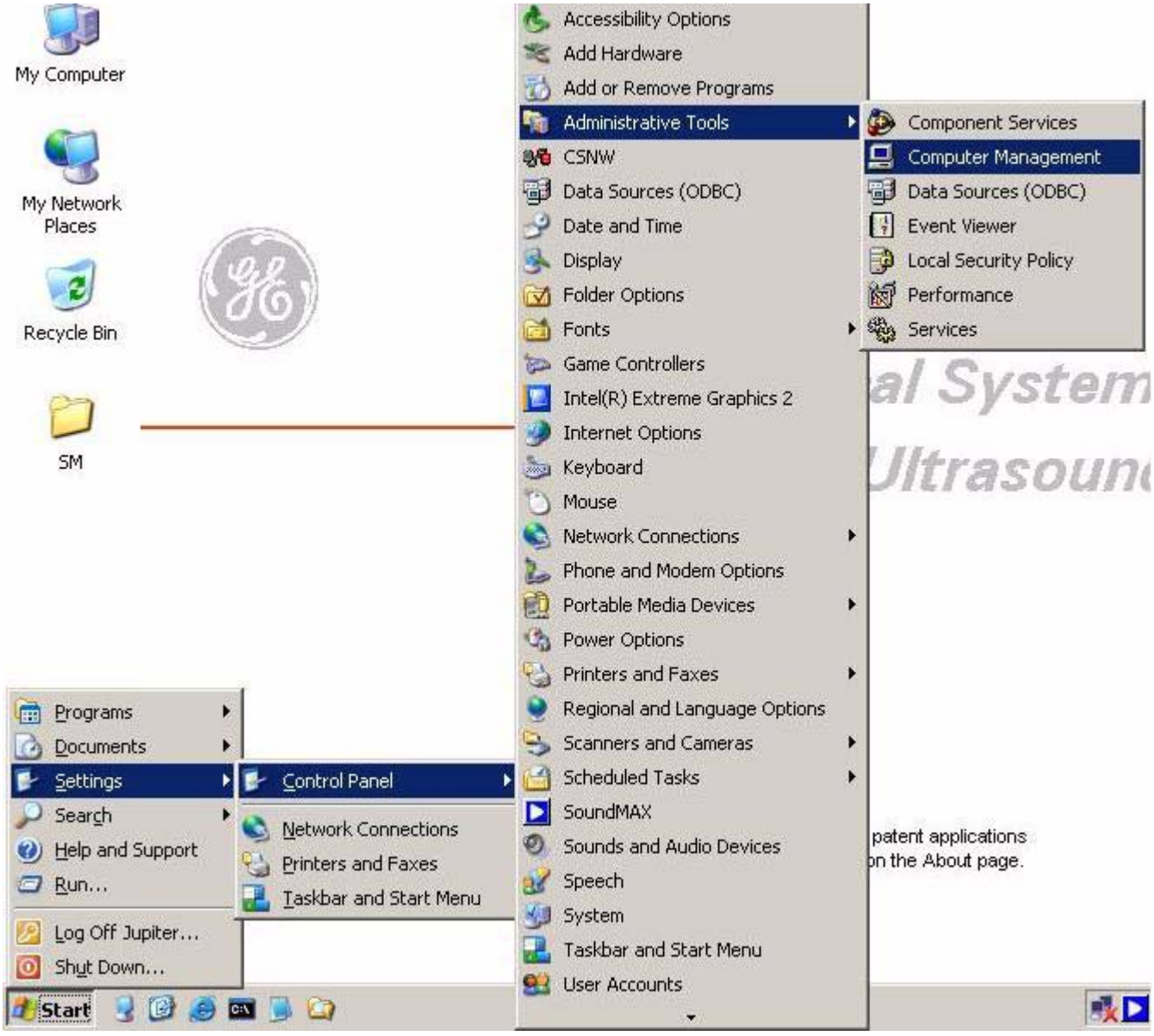


Figure 8-226 Path to Computer Management

8-11-1-1 System Checks (cont'd)

Select "Computer Management" then you should see a screen like below. Then left click on the device assigned currently to G:, right click on **Change Drive Letter and Path...**

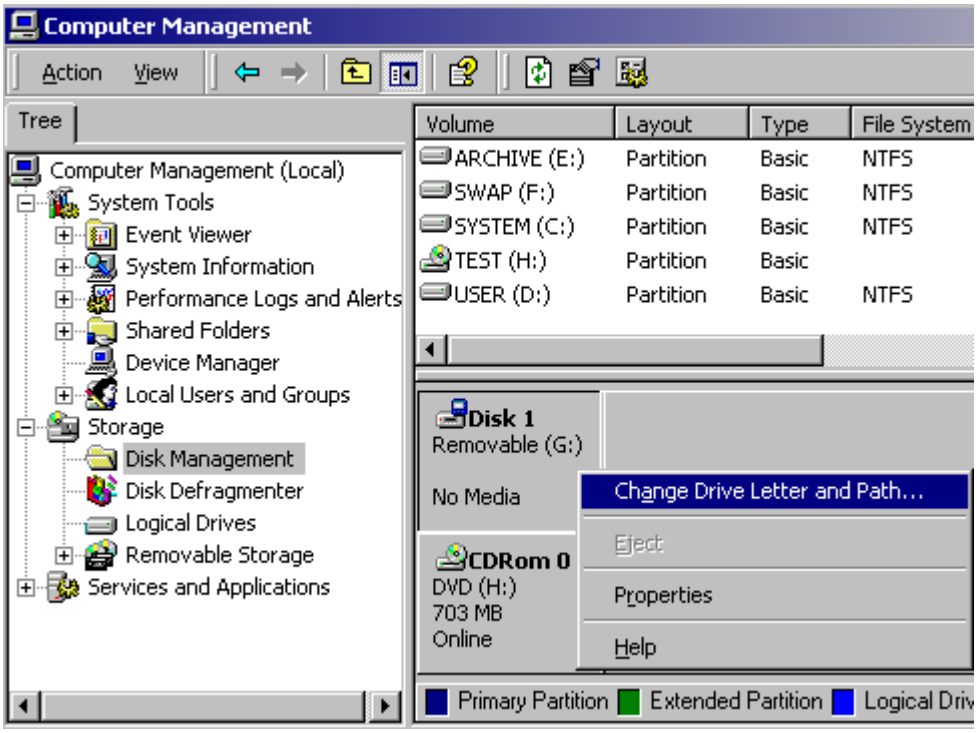


Figure 8-227 Computer Management

d.) Right click on **Edit**

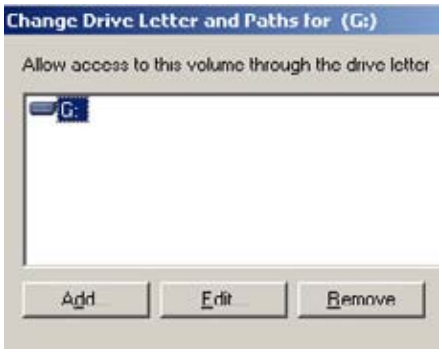


Figure 8-228 Change Driv Letter

8-11-1-1 System Checks (cont'd)

e.) Select the drive other than G: (I: is selected in the window shown below for example.)

Then click on **OK**

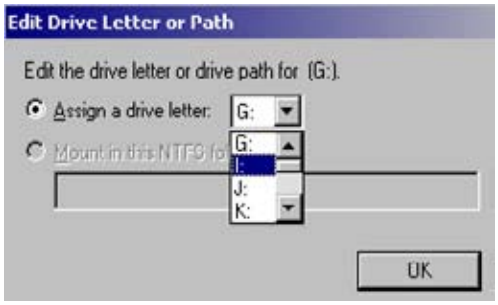


Figure 8-229 Edit Drive Letter

f.) Right click on **Yes**

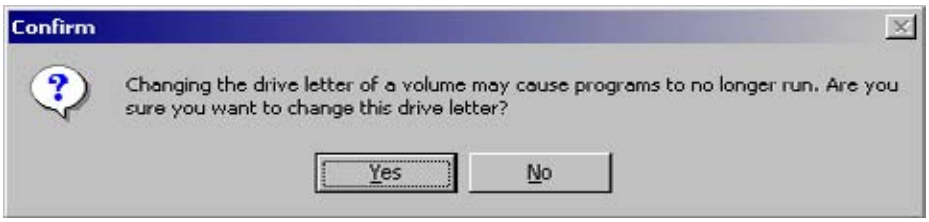

Confirm
Changing the drive letter of a volume may cause programs to no longer run. Are you sure you want to change this drive letter?
Yes
No

Figure 8-230 Confirm Window

g.) Left-click on CDROM0 Select drive then right click on **Change Drive Letter and Path...**

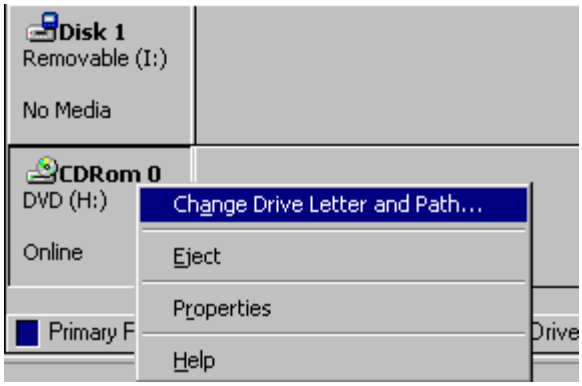


Figure 8-231 Change Drive Letter and Path

8-11-1-1 System Checks (cont'd)

h.) Right click on **Edit**

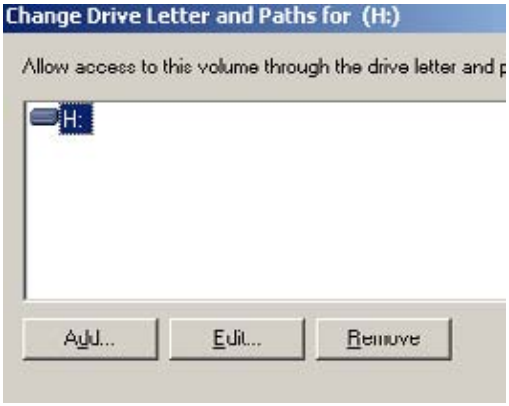


Figure 8-232 Change Drive Letter

i.) Select G: then rignt click on **OK**

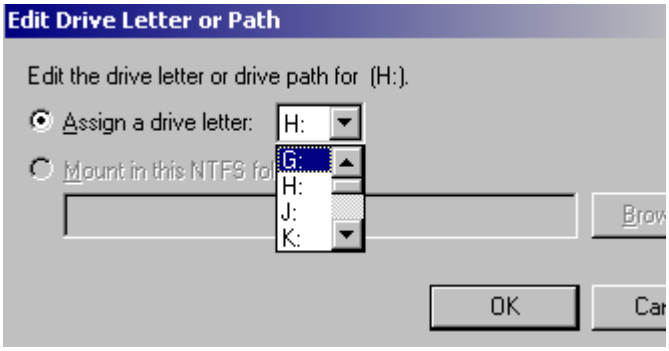


Figure 8-233 Edit Drive Letter

j.) Right click on **Yes**

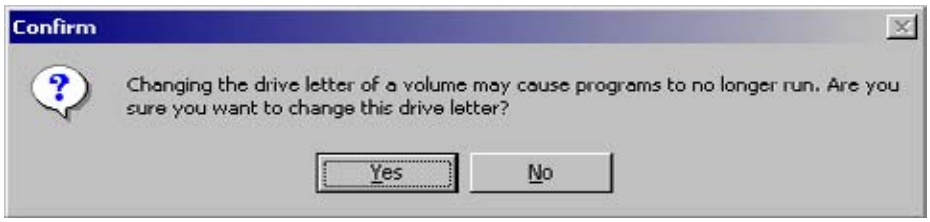

Confirm
Changing the drive letter of a volume may cause programs to no longer run. Are you sure you want to change this drive letter?
Yes
No

Figure 8-234 Confirm Window

8-11-1-1 System Checks (cont'd)

k.) Left click on the device which changed the drive number at the step c.). Right click on Change **Drive Letter and Path.**..

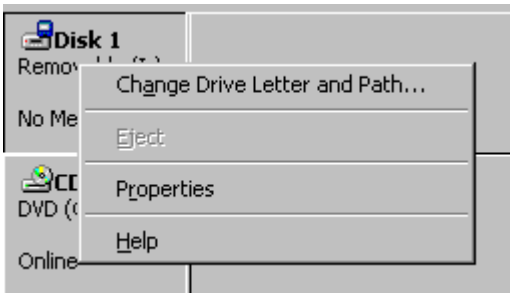


Figure 8-235 Change Drive Letter and Path

l.) Right click on **Edit**

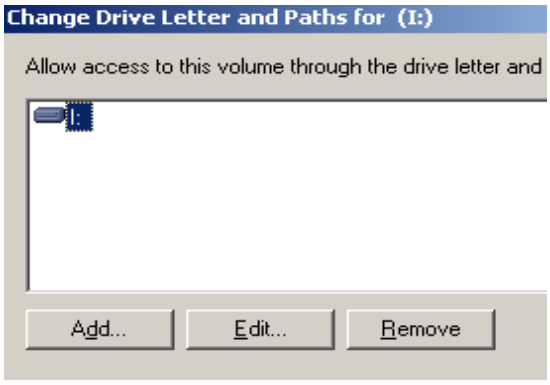


Figure 8-236 Change Drive Letter and Path

m.)Select H: and then right click on OK

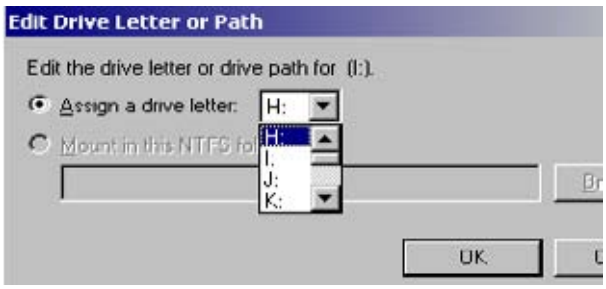


Figure 8-237 Edit Drive Letter and Path

8-11-1-1 System Checks (cont'd)

n.)Right click on Yes

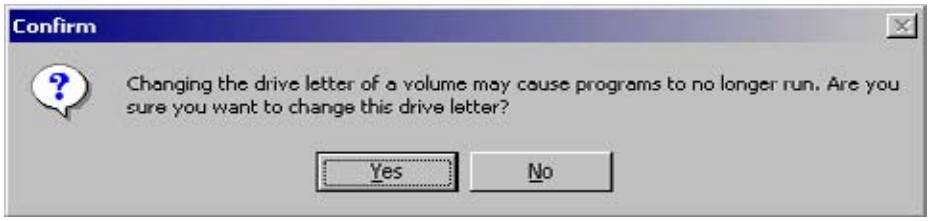

Confirm
Changing the drive letter of a volume may cause programs to no longer run. Are you sure you want to change this drive letter?
Yes
No

Figure 8-238 Confirm Window

o.) Close all windows

3.) Driver Checks:

a.) On the window XP desktop, left click on My Computer then right click on Properties

b.) The System Propertiers window appears. Select **Hareware > Device Manager**

c.) Verify that X or ! is not displayed

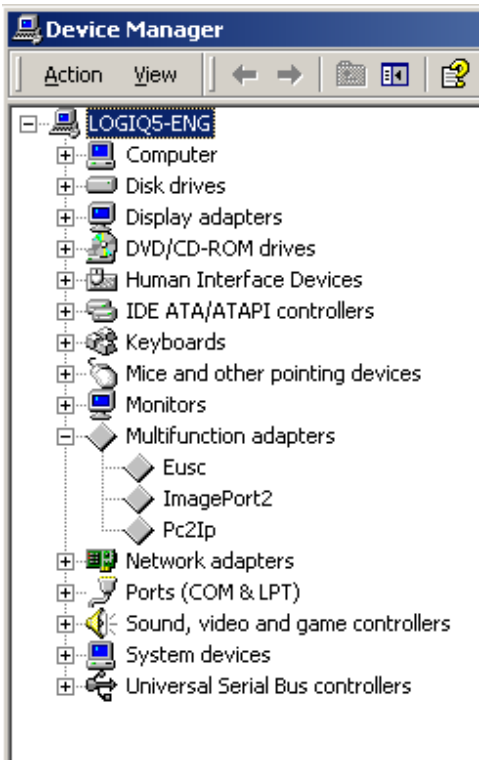


Figure 8-239 Device Manager

If X or ! is displayed:

- Left-click on the device with **X** mark, then right -click on **Enable**

- Left-click on the device with **!** mark, then right click on **Properties** to perform the device driver recognition. When some files are required, designate the file in the directories of **C:\WINNT\SYSTEM32** or **C:\WINNT\SYSTEM32\DRIVERS.** If they are not found, search them using a window search function.

8-11-1-2 USB Printer Checks (USB Printer User Only)

Without any newly additional user invention, LOGIQ5 will recognize the below 9 kinds of USB printer

Printer Name	Comment
HP 990 cxi, HP 6122 (BEP2 Only), HP5550 (BEP2 Only)	Standard Printer
EPSON Stylus Color 980H	Standard Printer
Lexmark Z65	Standard Printer
Sony UP-D895	Digital BW Printer
Sony UP-D897	Digital BW Printer
Sony UP-D23	Digital Color Printer
Sony UP-D21MD	Digital Color Printer
Mitsubishi P91D	Digital BW Printer
Mitsubishi CP900DW	Digital Color Printer
HP DeskJet 5652	General Inkjet Printer
HP DeskJet 6540	General Inkjet Printer

This procedure assumes that the LOGIQ5 base image software is installed and application software has been installed and is functioning properly.

1.) Attach the USB cable from the printer to the USB port on assigned position

Table 8-60 USB Port Position

USB Port Position	Peripheral
Right USB Port on Rear Connector Panel	Standard Printer
Left USB Port on Rear Connector Panel:	Digital Color Printer
USB Port on OP Printer Bracket Back Panel	Digital BW Printer

NOTICE *If you Plug in USB printer newly, shutdown the system and restart again*

NOTICE *Once plug in the cable one side of the USB port, do NOT change the cable to another port*

8-11-1-2 USB Printer Checks (USB Printer User Only) (cont'd)

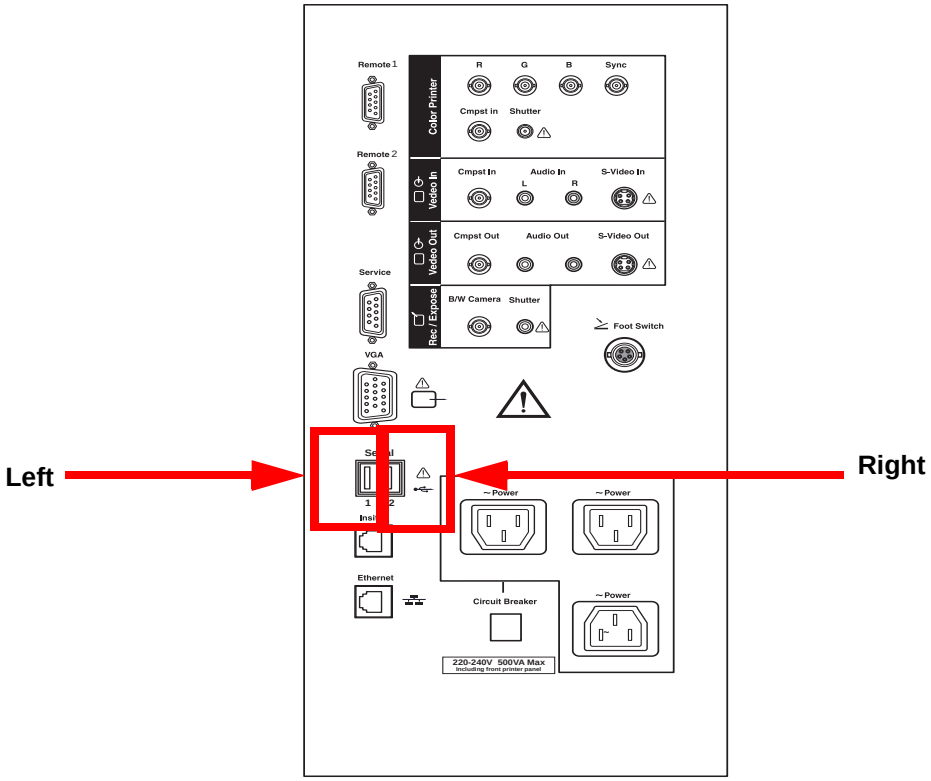


Figure 8-240 USB Port - Rear Panel Connector

Figure 8-241 USB Port - OP Printer Bracket Back Panel

2.) Make sure that printer properties are proper. (Image orientation and size). Refer to the latest Release Notes.

8-11-1-3 DMC Checks (DMC User Only)

1.) Check DMC Cable (USB to Serial Bridge).

NOTE: DMC Cable is supplied only as an option.

2.) Plug in the Cable as shown on the right side of the USB port. Refer to Figure 8-242.

Figure 8-242 DMC Cable

3.) Ensure USB to Serial Bridge port is COM4.
4.) Trackball to My computer icon and left click.
5.) Right click on Properties.
6.) Right click on the hardware tab.
7.) Right click on the device manager in the middle right of the hardware tab window.
8.) Expand ports (COM & LPT), If not COM4, Proceed as followed.
9.) Double click “USB to Serial Bridge” as shown Figure 8-243.

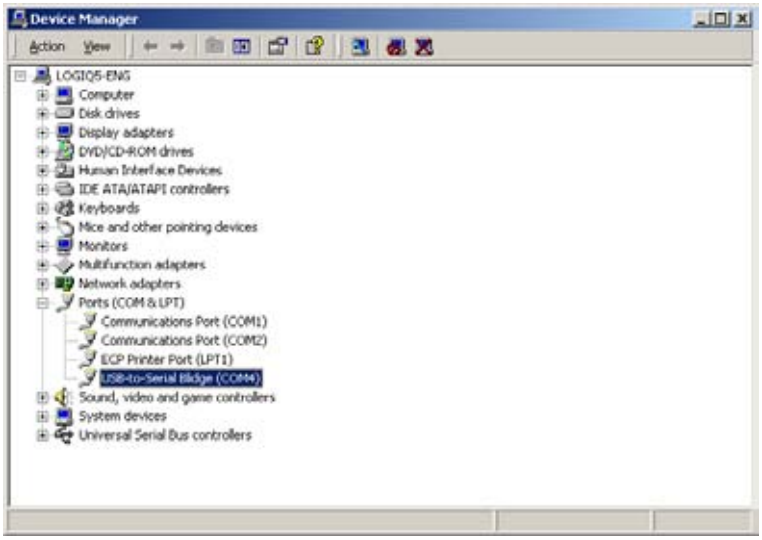


Figure 8-243 Device Manaer Window

8-11-1-3 DMC Checks (DMC User Only) (cont'd)

10.) Right click on port settings.

11.) Click on advanced .. button.

12.) Specify COM port number is COM4. as shown in refer to Figure 8-244.

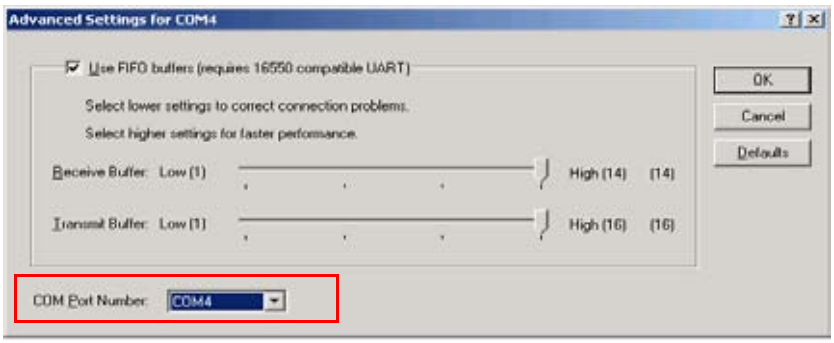


Figure 8-244 Advanced Settings for COM4

8-11-2 Installig Application Software(R4.x.x)

8-11-2-1 Installig Application Software(R4.x.x)

1.) Place the “Application Software” CDROM into the CDROM drive.

2.) Press the Start button on the tool bar at the bottom of the LCD screen and select “**Run…**”.

Enter “**g:\LoadSoftware**” into the dialog box.

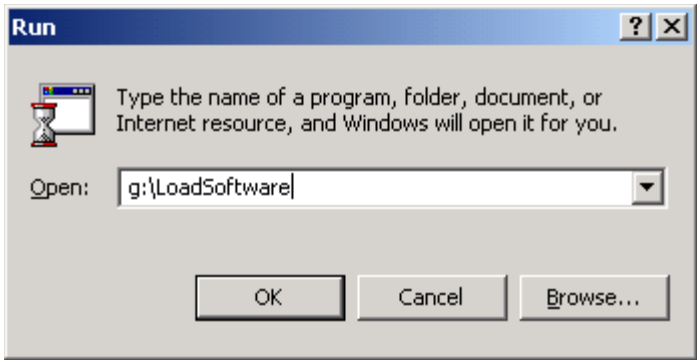


Figure 8-245 Run Load Software

3.) You will see a screen that warns you that you are about to load software, press the Y key to continue. Then the program requests confirmation “Are you sure ?”, Press the Y key again..You will see a Command (CMD) window open.

C:\WINDOWS\System32\cmd.exe
* [Install the application software] *
* WARNING: This program install the application software LOGIQ5 BT05 *
* R4.0.4 on the hard drive. This process should take *
* approximately 10 minutes to complete. *
You can stop now this installation to enter "N" key.
Proceed this program [Y,N]?

Figure 8-246 Command Window

4.) Press the "Y" key to continue. Then the program requests confirmation - "Are you sure?" then Press the "Y" key again.

5.) When you are asked to choose the software to install, select L5 Expert. You are also asked to press “Y” to confirm your selection

6.) The installation process will be started. it will take about 15 minutes.

7.) To apply the preset by region, select one of the below options. Refer to Figure 8-247.

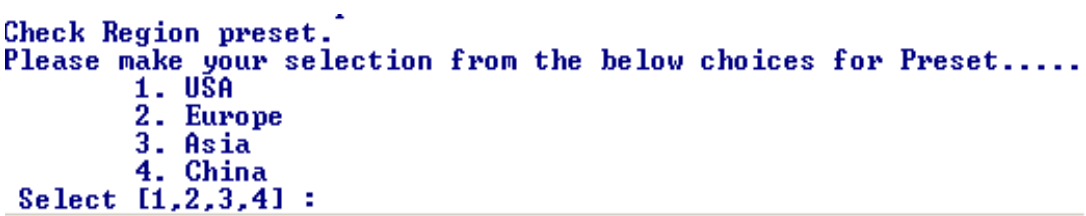


Figure 8-247 Region selection

8-11-2-1 Installig Application Software(R4.x.x) (cont'd)

8.) After the installation is completed the system will power off automatically.

NOTE: Do not operate with using mouse or keyboard during installation procedures.

9.) Turn on the system and immediately eject the button on the CD -R drive to eject the CDROM

10.) Verify that the system boots up no error.(It will take a few minutes)

8-11-3 Standard Confirmation & Functional Checks

Configure the system settings and perform functional checks after installation of software.

Items for configuration and functional checks include:

- Confirmation of the software version
- Setting Computer Name
- Functional Checks for ServicePlatform (Diagnostic Program)

8-11-3-1 Confirmation of Software Version

1.) Touch the Utility button on the Touch Panel

2.) Click on About tab. The software version will be shown on the monitor as shown. Confirm the following.

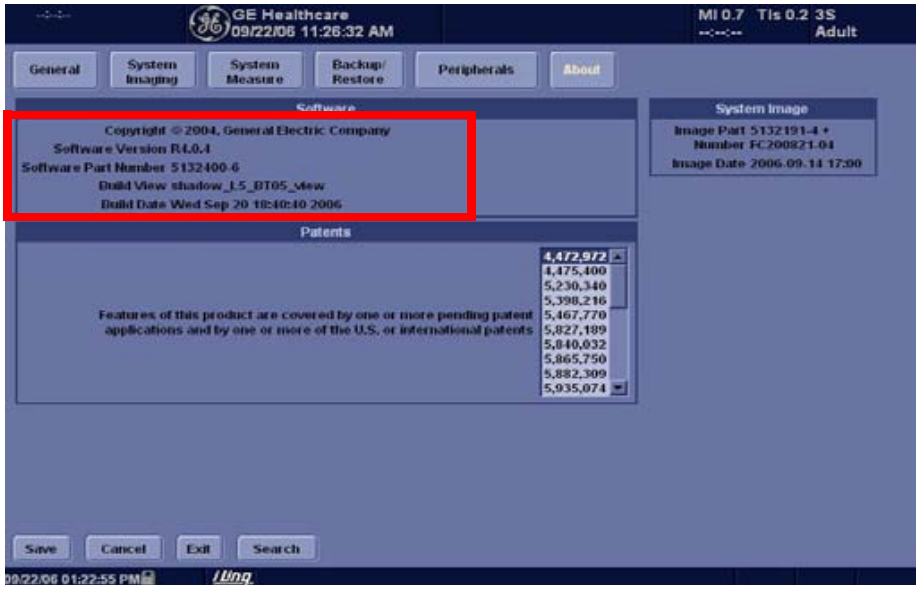


Figure 8-248 Confirmation of software version

3.) Make sure that Software Version: R4.x.x and Software Part Number is described on the Application CD-ROM.

8-11-3-2 Setting Computer Name

*NOTE: If the "Save" is NOT performed, you can **NOT** enter Patient screen and **NOT** perform Export/Import.*

1.) Touch Utility-> Connectivity
2.) Operator Login Window appears. Select ADM(Administrator) for operator field.Click OK button.

Figure 8-249 Set Computer Name

3.) Click on Tcpip tab

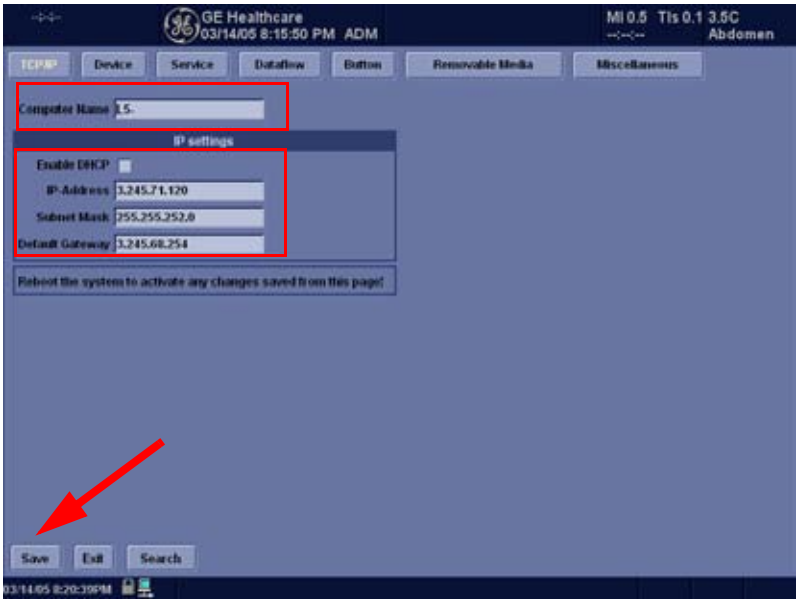


Figure 8-250 TCPIP tab

4.) Check if Computer Name, IP Address, Subnet Mask, and other parameters are proper.
5.) Click on Save button.
6.) Click OK for confirmation dialog box.
7.) The system will power OFF automatically.
8.) Turn on the system for functional checks.

8-11-3-3 Functional Checks for Service Platform (Diagnostic Program)

NOTE: After performing diagnostics, shut down and restart to make the system working properly.

1.) Make sure that the wrench icon is shown at the bottom of the scan screen. Click on the wrench icon to activate. It will take about ten (10) seconds for activating.

2.) Make sure that **CAPS** is not selected (should be dimmed) for password entry performed later.

Figure 8-251 Functional Checks

NOTE: If the following dialog box is shown on the monitor, select "Do not perform this check in the future" and click on the Yes button. This dialog box will not be displayed for next time.

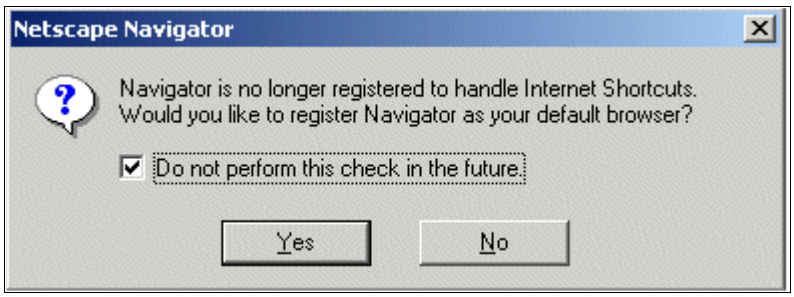

Netscape Navigator
Navigator is no longer registered to handle Internet Shortcuts.
Would you like to register Navigator as your default browser?
Do not perform this check in the future.
Yes
No

Figure 8-252 Service Plarform

8-11-3-3 Functional Checks for Service Platform (Diagnostic Program) (cont'd)

3.) The Service Login window for Service Platform will be shown on the monitor display.

Figure 8-253 Service Login Window

⚠ **CAUTION** **If the Login window for Service Platform is not displayed on the monitor, the installation of the Service Platform has failed. Reload the application software or Base System Software (OS) + application software. Contact a Technical Support for details.**

4.) Select **GE Service** at the "Select User Level" field.

5.) Enter the password for the Service Platform.

6.) Click on **Okay**.

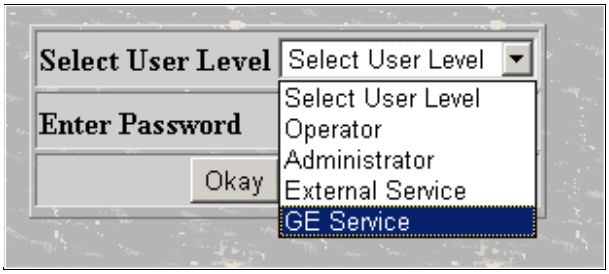


Figure 8-254 Select GE Service

7.) Verify that the following screen (Service Platform) is displayed on the monitor.

⚠ **NOTICE** When the service platform is NOT displayed, check if **CAPS** lock is selected. The **CAPS** should not be selected.

8-11-3-3 Functional Checks for Service Platform (Diagnostic Program) (cont'd)

8.) Click on **x** located at the upper right corner of the service platform screen to close the Service Platform and return to the scan panel.

Figure 8-255 Scan Panel

8-11-3-4 Setting the VCR (if necessary)

1.) Touch **Utility > System>Peripheral.**

2.) Click on **Setup** tab.

3.) Set the proper parameters:

- PAL or NTSC
- VCR type
- Source type

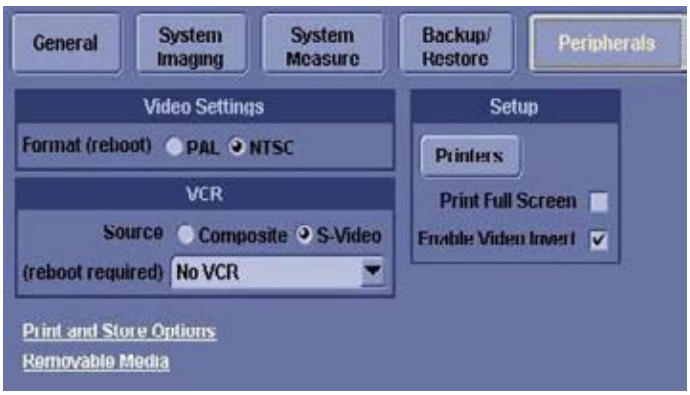


Figure 8-256 Utility > System>Peripheral

4.) Click on **Save.**

5.) Shut down the scanner, then restart the scanner.

6.) Verify that the VCR can be properly operated (remote, play...).

⚠ **NOTICE** Be sure to connect the converter and cablebefore booting up the system. Otherwise the LOGIQ 5 system does not recognize the peripheral devices

Section 8-12
Full Backup / Restore Procedure

8-12-1 General

This describes a Full Backup (Database, Image, User preset, Service Data) procedure.

Use this instruction when you need to save the data :

- before changing a HDD with a new one
- before reinstalling Base Application
- when you just want to save all of the current data.

8-12-2 Parts Required

USB HDD

8-12-3 Full Backup Procedure

1.) While the Echoloader is running, press ‘Utility’ button and click on the ‘Admin’.
2.) When Title Login window pops up, select an operator with admin authorization.
3.) Type in the password.
4.) press “OK”.
5.) Select “System Admin” page.
6.) press “Execute” button under Full Backup box and the window below pops up.

Backup and Restore
The Emergency Disk Making Wizard will help you to create
a copy of the information on your system hard disk.
the original data on your hard disk is accidentally erased or overwritten,
you can use the emergency disk to restore your lost or damaged data.
We strongly recommend you to make an Emergency Repair Disk!
Click Backup or Restore button to continue...
Backup
Restore
Close

Figure 8-257 Backup and Restore Window

8-12-3 Full Backup Procedure (cont'd)

7.) Press "Backup". Then the below window pops up..

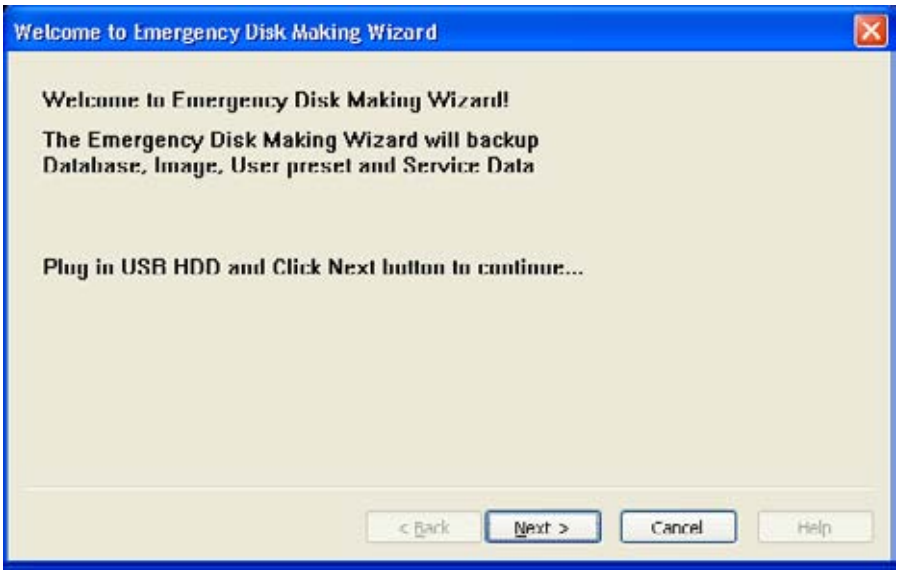

Welcome to Emergency Disk Making Wizard
Welcome to Emergency Disk Making Wizard!
The Emergency Disk Making Wizard will backup
Database, Image, User preset and Service Data
Plug in USB HDD and Click Next button to continue...
< Back
Next >
Cancel
Help

Figure 8-258 Emergency Disk Making Wizard

8.) Insert a USB HDD.

NOTE: It might take about 30 seconds for the system to recognize the USB HDD.

9.) Press "Next".

10.) Select USB HDD for backup when Select Drive window is displayed.

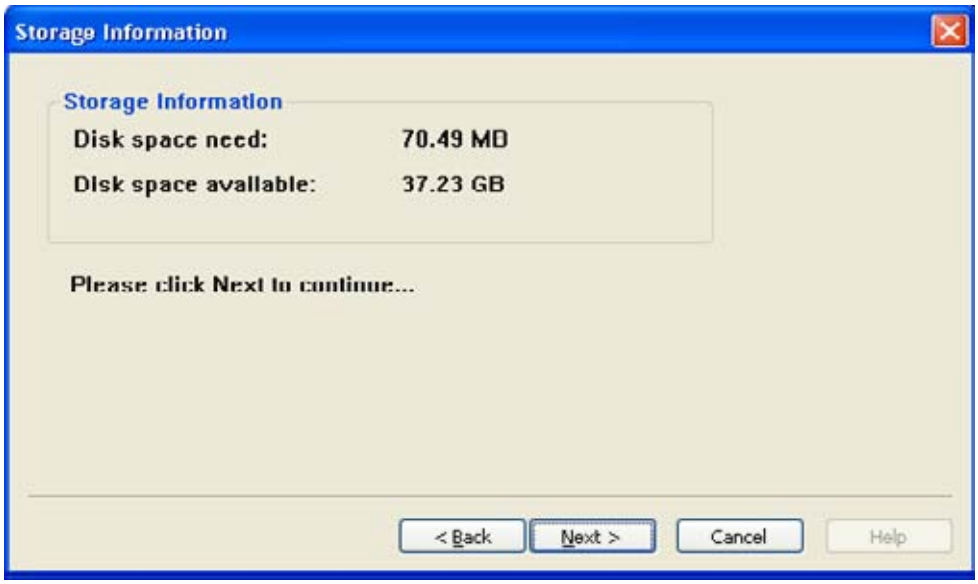


Figure 8-259 Select USB HDD

8-12-3 Full Backup Procedure (cont'd)

11.) If USB HDD with enough space is not already plugged in, plug in one.Then press Next

Figure 8-260 Storage Information

12.) Press next to continue. Then the below windows appear.

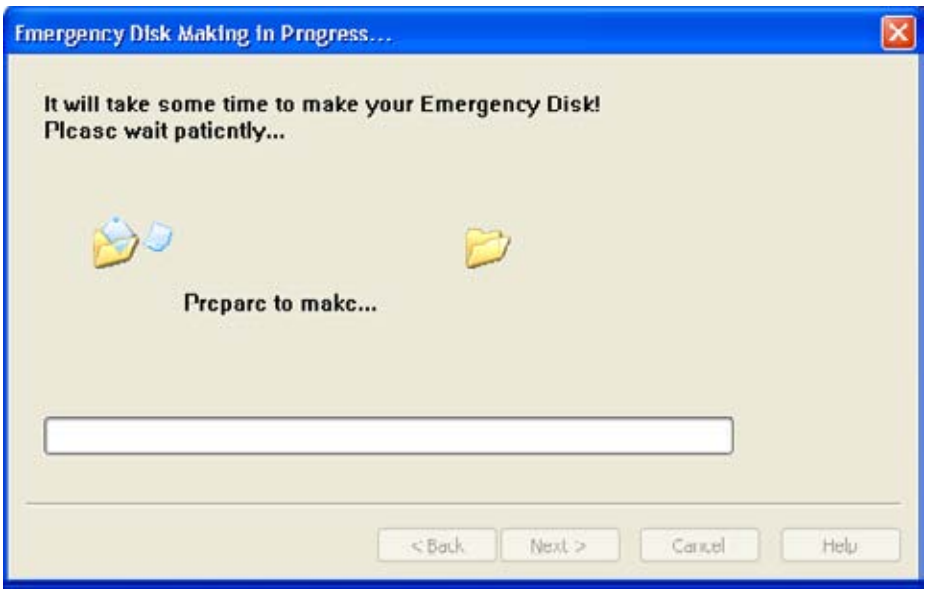


Figure 8-261 Emergency Disk Making Preparation

8-12-3 Full Backup Procedure (cont'd)

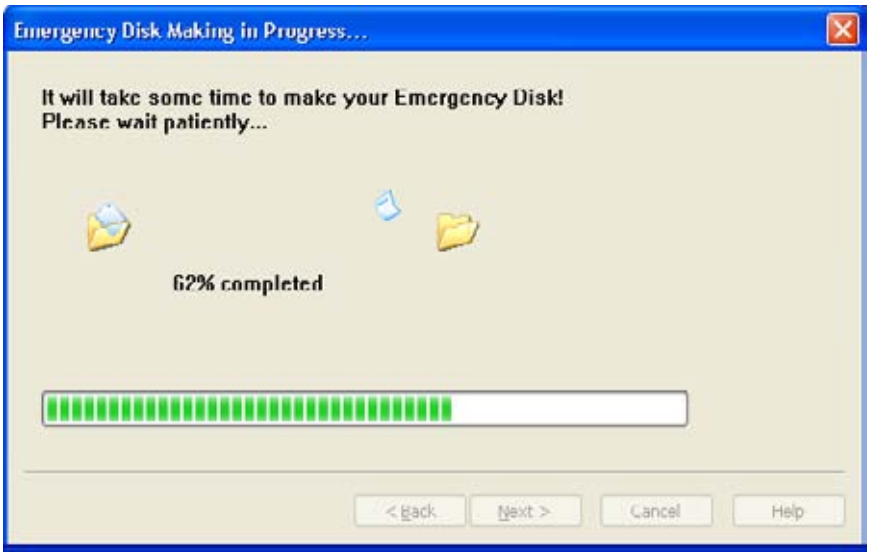


Figure 8-262 Emergency Disk Making in Progress

13.) Press Finish to complete.

14.) Check if four files are created in the USB HDD.

- DB_IMG.zip
- Service_SQL.zip
- SYSTEMNAME.DAT
- UserDef.zip

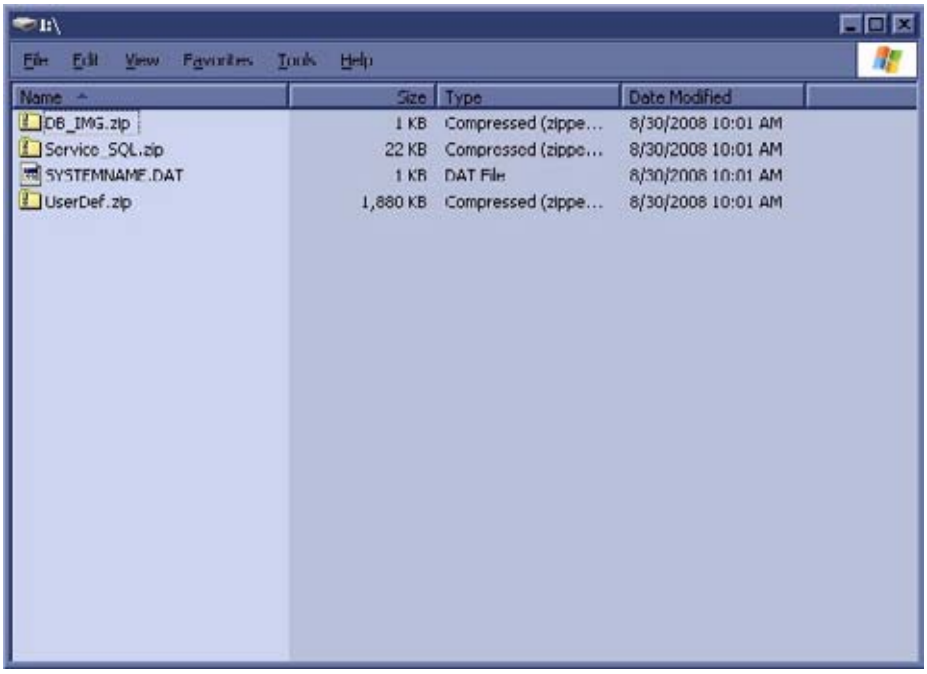

File Edit View Favorites Tools Help
Name
Size
Type
Date Modified
DB_IMG.zip 1 KB Compressed (zippe... 8/30/2008 10:01 AM
Service_SQL.zip 22 KB Compressed (zippe... 8/30/2008 10:01 AM
SYSTEMNAME.DAT 1 KB DAT File 8/30/2008 10:01 AM
UserDef.zip 1,880 KB Compressed (zippe... 8/30/2008 10:01 AM

Figure 8-263 USB HDD

NOTE: Double click the zip archive files and check if the archived files are the same as the original files.

Archive File	Original File Path
DB_IMG.zip	E:\Idunn\GEMS_IMG\
Service_SQL.zip	C:\SYBASE\INI\ C:\IP_BACKUP.DAT
UserDef.zip	D:\Jupiter\target\resources\idunn\userdefs\

Table 8-1 Zip Archive File

8-12-4 Restore procedure

1.) From Figure 8-257, press “Restore” button.

Rest of the procedure is the same with “Backup” procedure.

NOTICE **The system should be rebooted after finishing of Restore procedures.**

2.) * Compare the archived files and the restored files. The procedure is the same with "8-12-3 "Full Backup Procedure" on page 8-202.

Chapter 9
Renewal Parts

Section 9-1
Overview

9-1-1 Purpose of Chapter 9

This chapter gives you an overview of Renewal Parts for LOGIQ™ 5.

Table 9-1 Contents in Chapter 9

Section	Description	Page Number
9-1	Overview	9-1
9-2	List of Abbreviations	9-1
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9-5	Monitor	9-5
9-6	Keyboard Block	9-7
9-7	Covers	9-9
9-8	Body Block	9-11
9-9	PCB Boards	9-13
9-10	PC Block	9-15
9-11	Power Block	9-17
9-12	Options, Peripherals, Cables	9-19

Section 9-2
List of Abbreviations

- Assy - Assembly
- Ctrl - Control
- FRU 1 - Replacement part available in part hub
- FRU 2 - Replacement part available from the manufacturer (lead time involved)
- Int - Internal
- I/O - Input/Output
- KB - Keyboard
- LCD - Liquid Crystal Display
- MON - Monitor
- PAT. - Patient
- PC - Personal Computer (Back End Processor)

Section 9-3
Renewal Parts Lists

9-3-1 Equipment Models Covered in this Chapter

Part Name	Part Number	Quantity										Description
OPERATOR CONSOLE ASSY	2332322	1										100V, NTSC
OPERATOR CONSOLE ASSY	2353367		1									120V, NTSC
OPERATOR CONSOLE ASSY	2355478			1								220V, PAL
OPERATOR CONSOLE ASSY	2328016				1							220V, NTSC
OPERATION MANUAL	2300002-100		1		1							
ADV. REFERENCE MANUAL	2318641-100		1		1							
SERVICE MANUAL	2300000	1	1	1	1							
QUICK GUIDE	2300003-100		1		1							
JAPAN (H41302LA, 2331750)												
USA (H41302LE, 2353133)												
EUROPE (H41302LF, 2355477)												
KOREA (H41302LD, 2331753)												

Section 9-4 OPERATOR CONSOLE ASSY

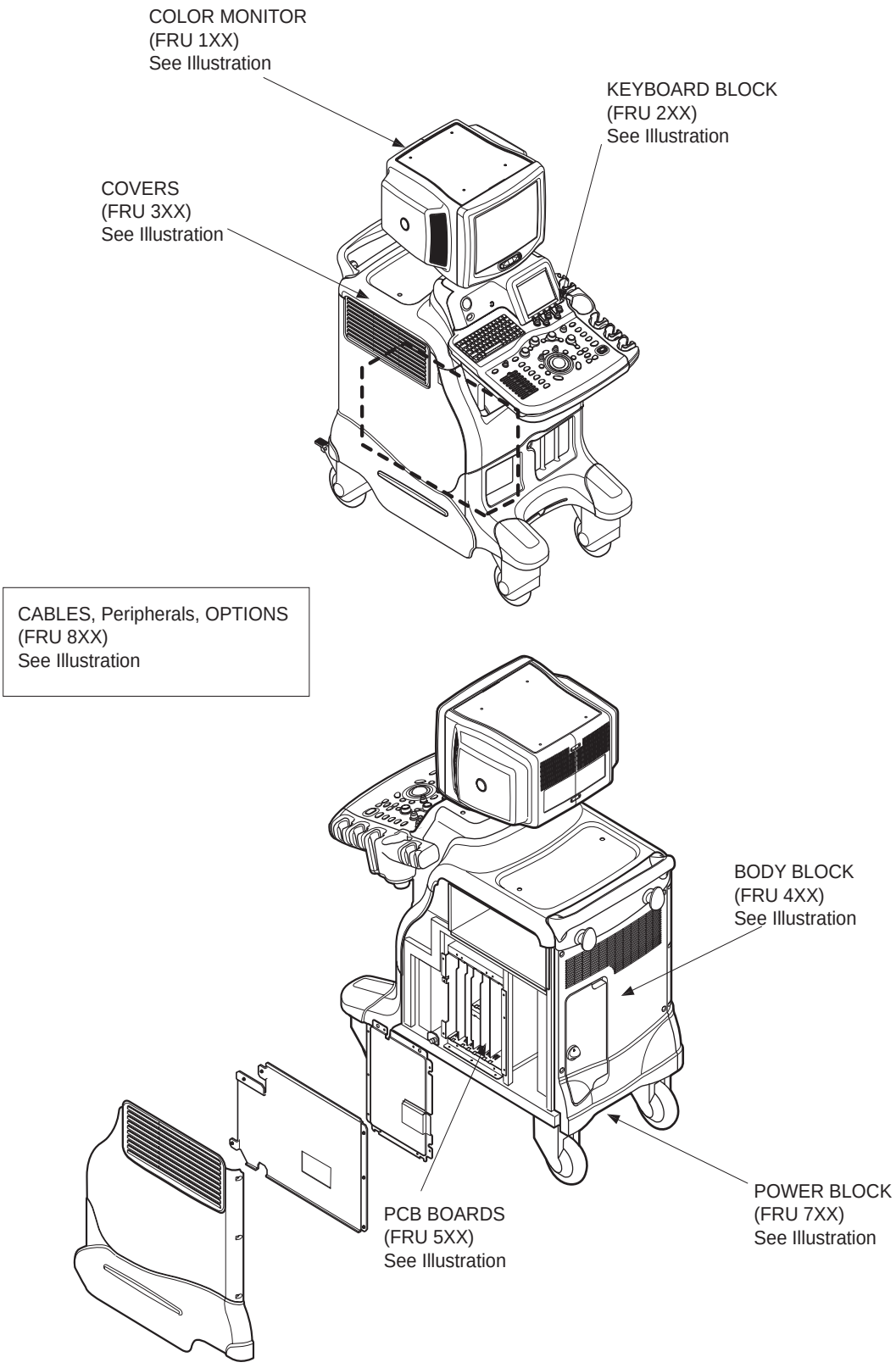


Figure 9-1 OPERATOR CONSOLE ASSY

Section 9-5 MONITOR

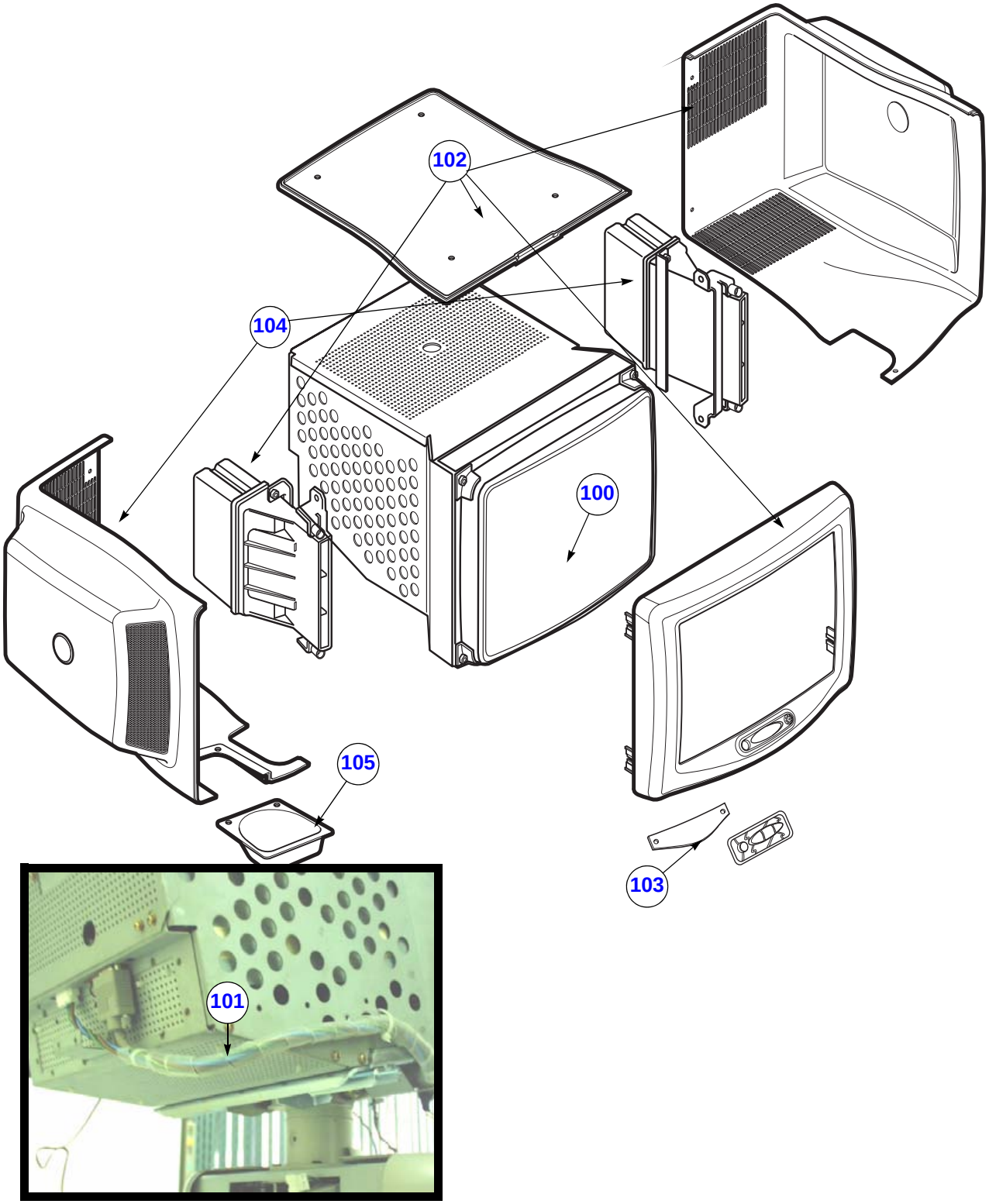


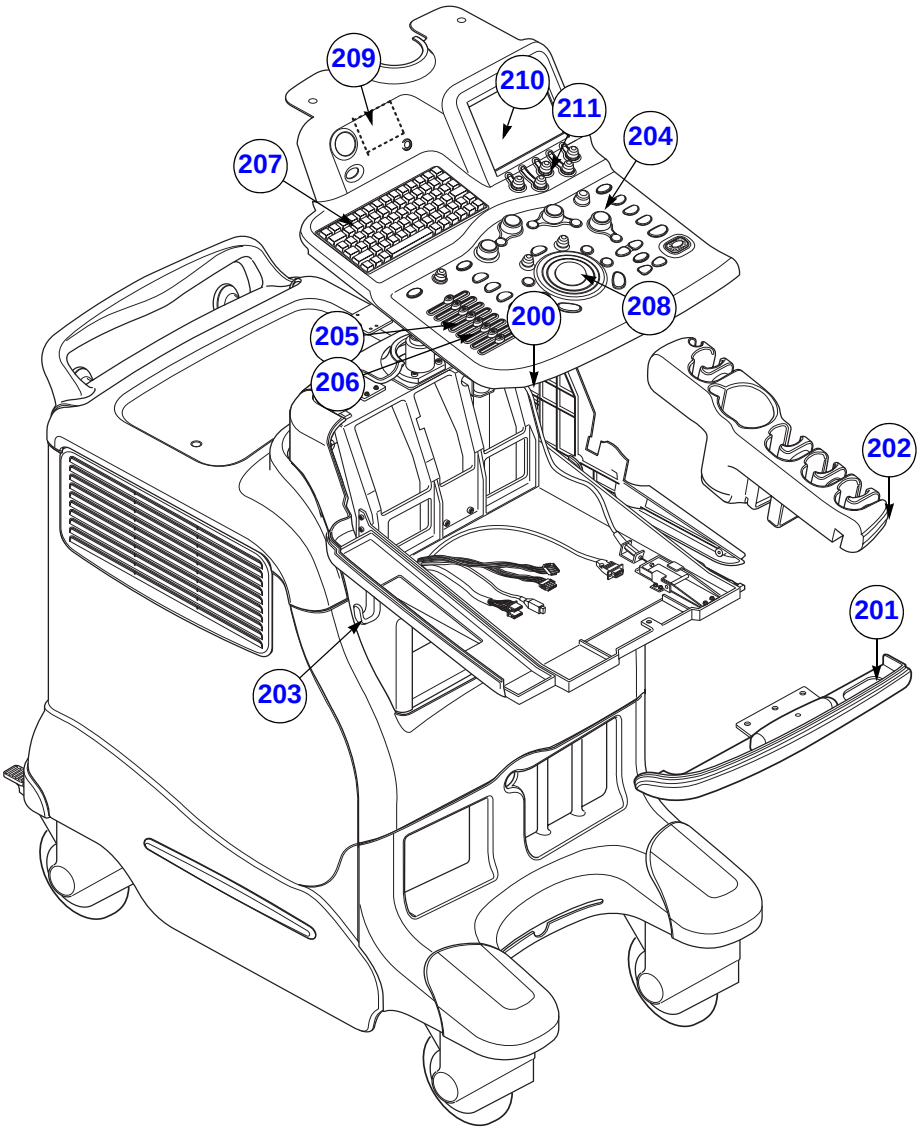
Figure 9-2 Monitor

Section 9-5 MONITOR (cont'd)

Table 9-2 MONITOR

Item	Part Name	Part Number	Description	Qty	FRU
100	MONITOR CRT ASSY	2299998-3	CRT W/O COVERS	1	1
101	MONITOR CABLE ASSY	2299964	CABLE	1	1
102	MONITOR COVER SET	2300006	PLASTIC COVER SET WITH SEPARATE LABEL	1	2
103	MONITOR S/W ASSY	2300008	common with LOGIQ 3	1	2
104	SPEAKER ASSY	2317340	SPEAKER PLUS BRACKET	2	2
105	TASK LAMP	2317347	common with LOGIQ 3	1	1

Section 9-6 KEYBOARD BLOCK



NOTE : FRU 212 ~223 ARE NOT ILLUSTRATED IN THIS FIGURE

Figure 9-3 KEYBOARD BLOCK

Section 9-6 KEYBOARD BLOCK (cont'd)

Table 9-3 COMMON KEYBOARD SPARE PARTS

Item	Part Name	Part Number	Description	Qty	FRU
200	KB ASSY	2299986-4	INCLUDE LCD COVER	1	1
201	KB FRONT GRIP	2299984-2	PLASTIC GRIP	1	2
202	PROBE HOLDER	2300010	INCLUDE CUP HOLDER	1	2
203	ECG CABLE HOOK	2283028	PLASTIC HOOK	1	2
204	OP PANEL ENCODER ASSY	2317341	ALL ENCODERS WITH CABLES	1	1
205	OP PANEL TGC ASSY	2317342	TGC WITH KNOB	1	1
206	TGC KNOB SET	2356244	TGC KNOBS	1	1
207	OP PANEL A/N KEY BOARD ASSY	2317343	BOARD OF A/N KEY SWITCH	1	1
208	OP PANEL TRACKBALL ASSY	2317344	Common with LOGIQ 3	1	1
209	HUB BOARD ASSY	2331557	CIRCUIT BOARD	1	1
210	OP PANEL LCD ASSY	2317346	CIRCUIT BOARD	1	1
211	LCD ENCODER ASSY	2331741	CIRCUIT BOARD	1	1
212	P KEY LABEL	2364143	USER DEFINED KEY LABEL	1	1
213	GEL HOLDER	2384742		1	1
214	ITV BLOCK	2384743		1	2
215	FREEZE KEY	2384744		1	2
216	KEYBOARD MAIN BOARD	2384745	KEYB'D MAIN PCB BOARD	1	2
217	PROBE HOLDER BRACKET	2384746		1	1
221	HUB ASSY	2385577	FOR LOGIQ 5 ONLY	1	1

Section 9-7 COVERS

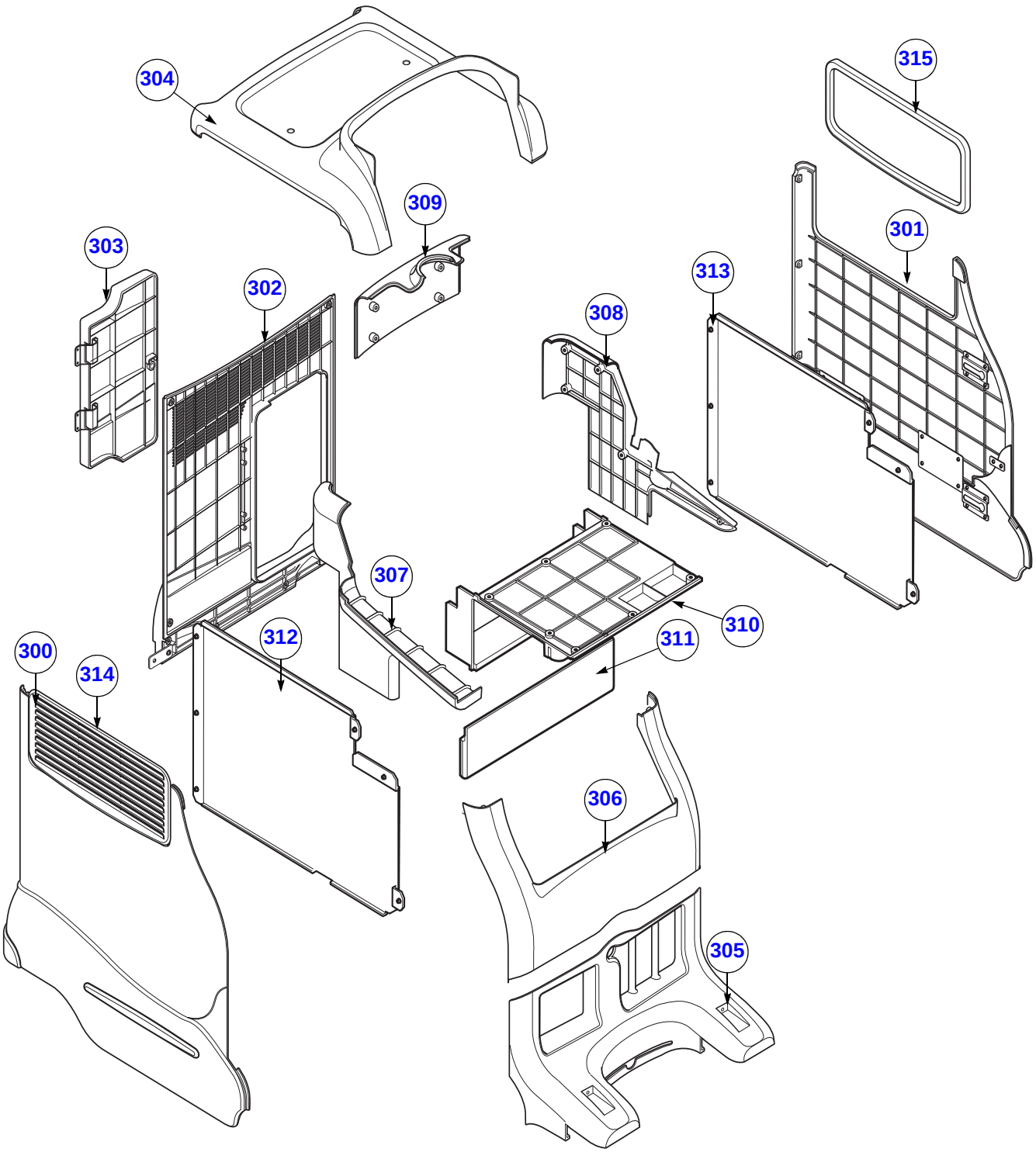


Figure 9-4 COVERS

Section 9-7 COVERS (cont'd)

Table 9-4 COVERS

Item	Part Name	Part Number	Description	Qty	FRU
300	LEFT COVER	2299995	INCLUDE LEFT BOTTOM COVER & SIDE MOLDING	1	2
301	RIGHT COVER	2300004	INCLUDE RIGHT BOTTOM COVER & SIDE MOLDING	1	2
302	REAR DOVER	2300005	INCLUDE REAR BOTTOM COVER&SIDE MOLDING	1	2
303	REAR DOOR COVER	2300007	INCLUDE DOOR BOTTOM COVER	1	2
304	TOP COVER	2299990	PLASTIC COVER	1	2
305	FRONT BASE COVER	2299993	PLASTIC COVER	1	2
306	FRONT COVER	2299991	PLASTIC COVER	1	2
307	OP SIDE L COVER	2300011	PLASTIC COVER	1	2
308	OP SIDE R COVER	2300013	PLASTIC COVER	1	2
309	OP REAR COVER	2300014	PLASTIC COVER	1	2
310	OP BOTTOM COVER	2300009	PLASTIC COVER	1	2
311	OP CURTAIN COVER	2300015	INCLUDE SHEET METAL	1	2
312	EMI COVER L	2300025	METAL PLATE	1	2
313	EMI COVER R	2300026	METAL PLATE	1	2
314	SIDE CAP	2317349	PLASTIC COVER	1	2
315	SIDE FRINGE AB	2303896	COMMON WITH L7	1	2

Section 9-8 BODY BLOCK

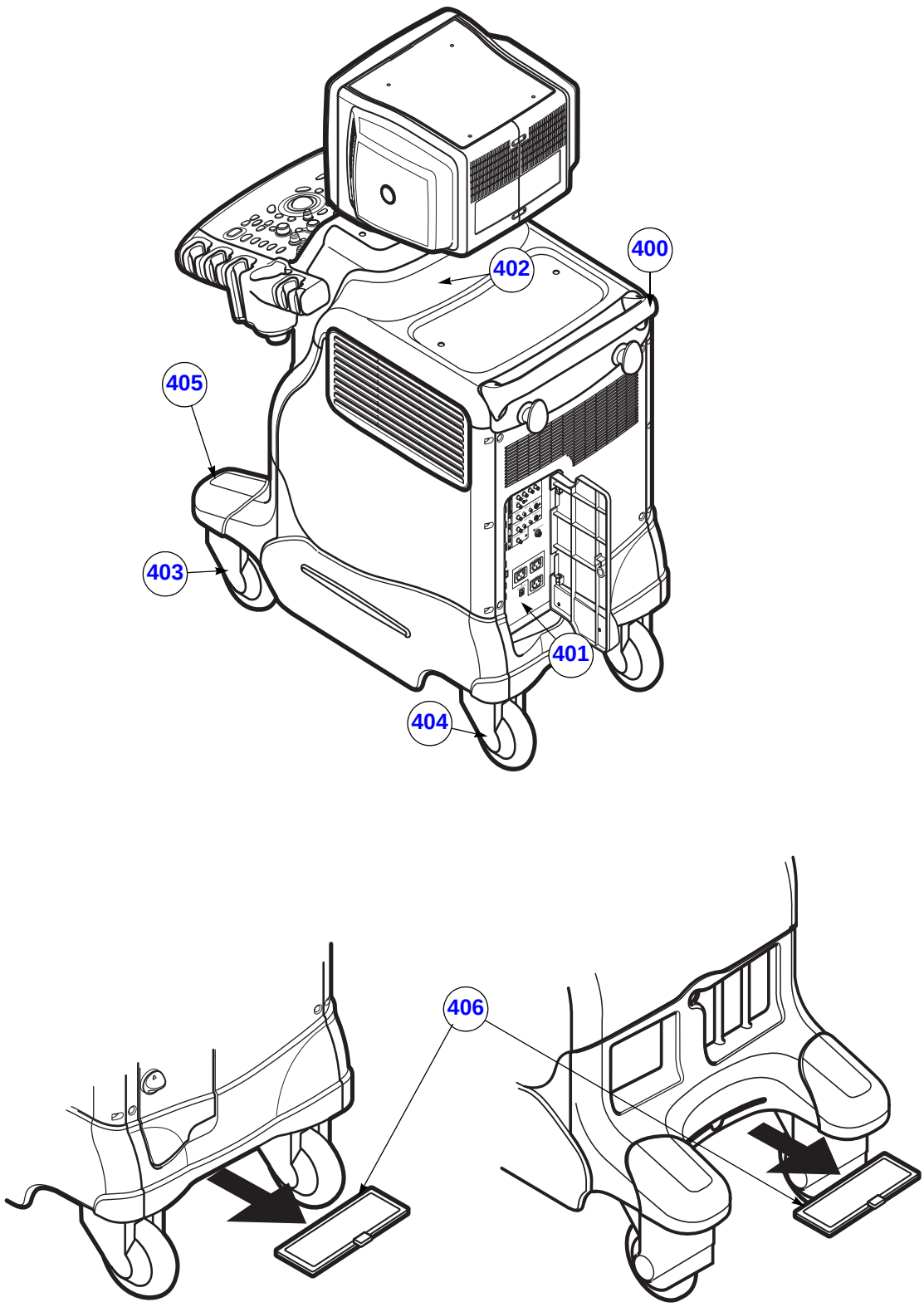


Figure 9-5 BODY BLOCK

Section 9-8 BODY BLOCK (cont'd)

Table 9-5 BODY BLOCK

Item	Part Name	Part Number	Description	Qty	FRU
400	REAR HANDLE	2300016	PLASTIC BAR	1	2
401	REAR PANEL ASSY	2300019	110V For US JPN	1	2
	REAR PANEL ASSY	2337035	220V For Europe	1	2
402	GAS SPRING ASSY	2300020	gas spring including release cable and mechanical parts	1	2
403	FRONT CASTER	2300021	Common with LOGIQ 3	2	2
404	REAR CASTER	2300022	Common with LOGIQ 3	2	2
405	BUMPER SET	2300024	PLASTIC	2	2
406	AIR FILTER SET	2317724	FILTER	2	2

Section 9-9 PCB BOARDS

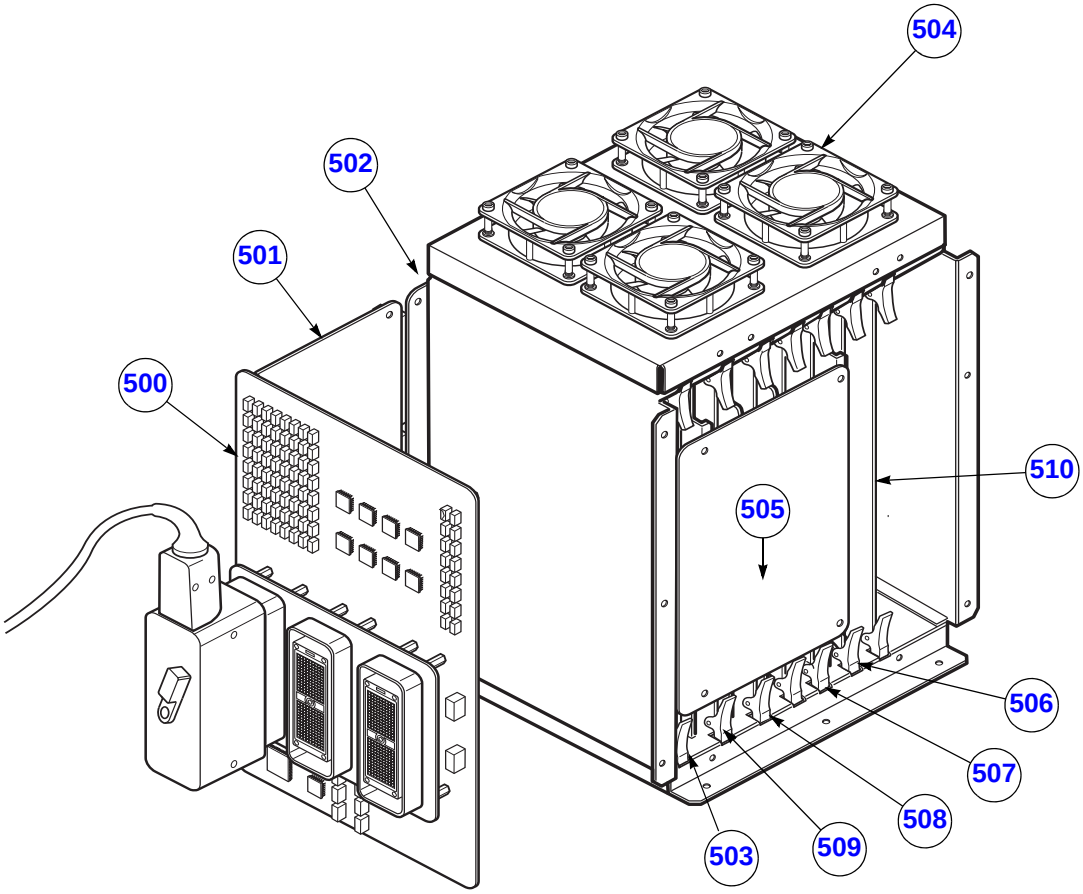


Figure 9-6 PCB BOARDS

Section 9-9 PCB BOARDS (cont'd)

Table 9-6 PCB BOARDS

Item	Part Name	Part Number	Description	Qty	FRU
500	RLY ASSY	2299950	PROBE INTERFACE RELAY ASSY	1	1
501	LMT ASSY	2324741	LIMITER ASSY	1	1
502	BACKPLANE	2299961	BACKPLANE FOR CONNECTION OF END ASSYS	1	2
503	PMP ASSY	2299949	RECEIVING PREAMP ASSY	1	1
504	DC FAN ASSY	2299988	COOLING FAN	1	1
505	SIG ASSY	2299951	Rx/Tx CHANNEL CONNECTION PCB	1	1
506	FEC ASSY	2299162-2	FRONT END CONTROL ASSY	1	1
507	RDS ASSY	2299947	RECEIVE DELAY SUMMING ASSY	2	1
508	CWDOP ASSY	2324742	STEERING CW DOPPLER PROCESSIGN ASSY	1	1
509	ATD ASSY	2299948-2	ADVANCED TRANSMIT DELAY ASSY	1	1
510	HV ASSY	2324743-2	HIGH VOLTAGE	1	1
511	VIC CARD	2384747-2	VIC CARD	1	1

Figure 9-7 PCB BOARDS

Section 9-10 PC BLOCK

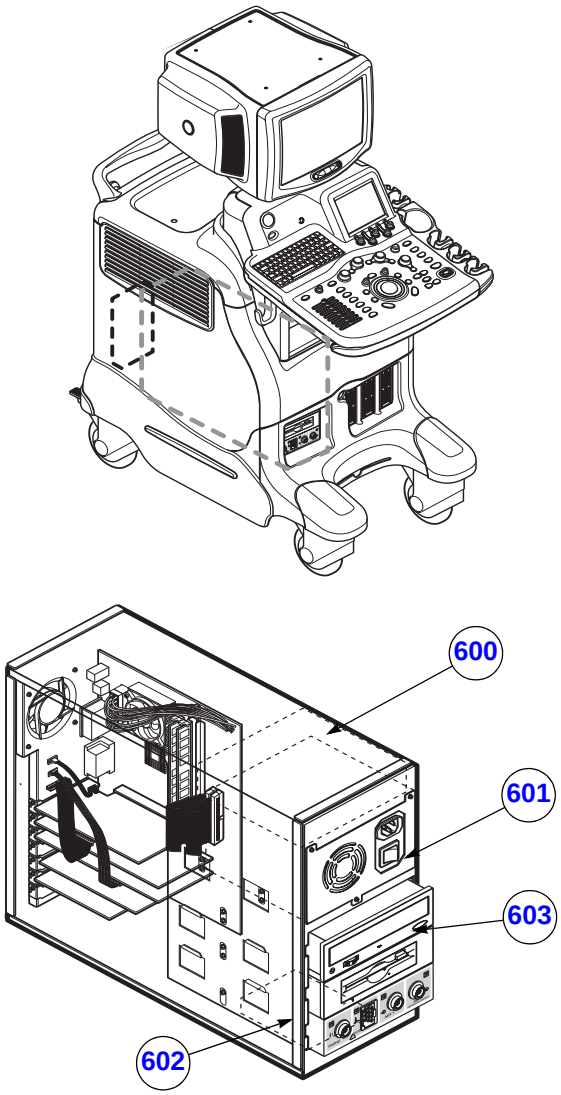


Figure 9-8 PC BLOCK

Section 9-10 PC BLOCK (cont'd)

Table 9-7 PC BLOCK

Item	Part Name	Part Number	Description	Qty	FRU
600	BEP2 ASSY WITH CABLE AND CD	2379029	BEP2 ASSY WITH CABLE AND CD	1	1
601	BEP POWER SUPPLY ASSY	2299971	ATX SMPS FOR PC BOX	1	1
602	HARD DISK	2299980	HARD DISK DRIVE	1	1
603	CD R/W	2301973	CD R/W DRIVE	1	1

Section 9-11 POWER BLOCK

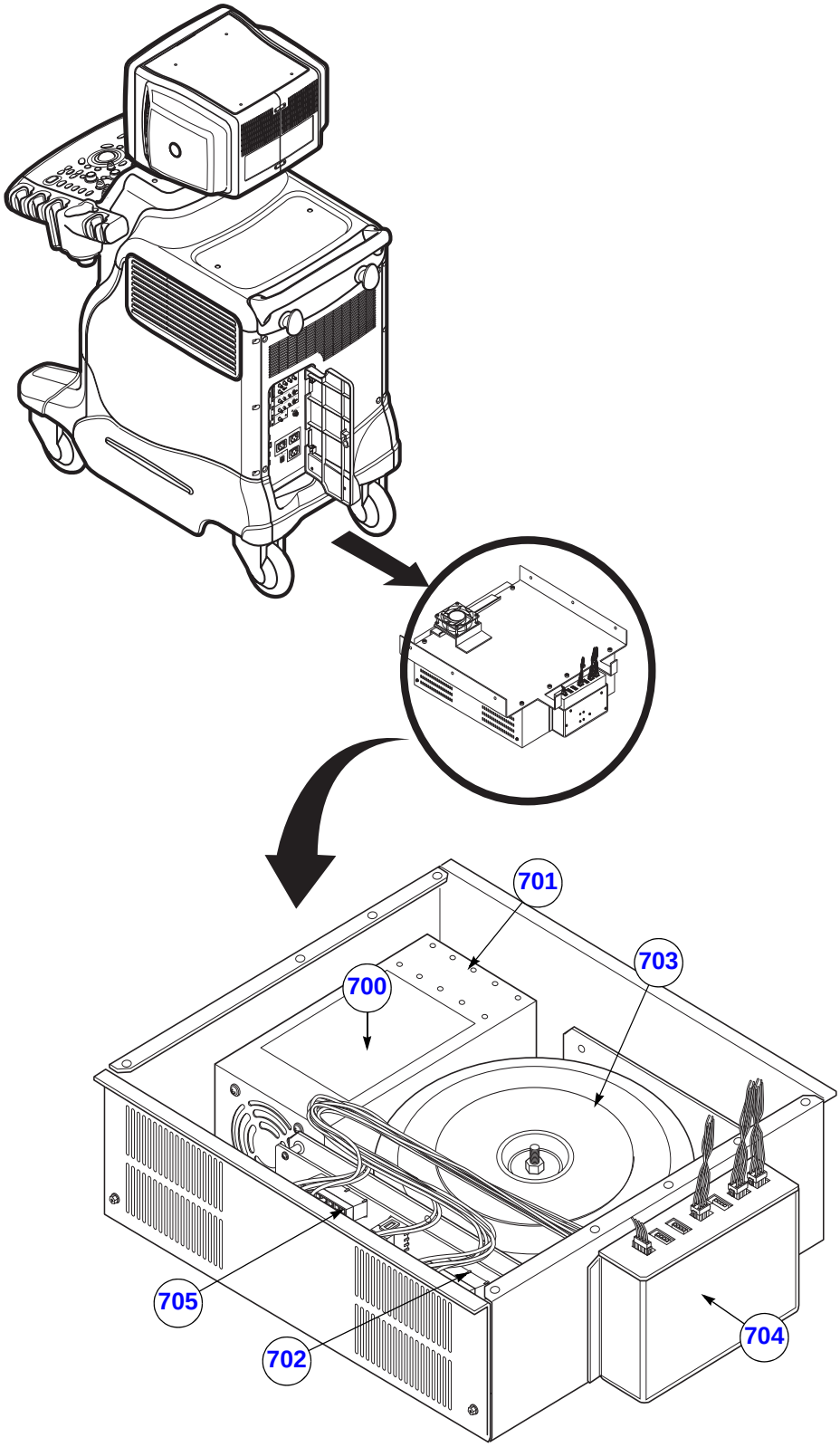


Figure 9-9 POWER BLOCK

Section 9-11 POWER BLOCK (cont'd)

Table 9-8 POWER BLOCK

Item	Part Name	Part Number	Description	Qty	FRU
700	AC POWER ASSY	2299962	AC POWER FOR JPN USA	1	2
		2337036	AC POWER FOR EUROPE	1	2
		2337037	AC POWER FOR KOR CHILE	1	2
701	LV UNIT	2317354	LOW VOLTAGE REGULATOR	1	1
702	JPC ASSY	2331746-2	110V FOR JAPAN AND USA	1	2
		2337038-2	220V FOR EUROPE	1	2
703	TRANSFORMER	2317356	POWER TRANSFORMER	1	2
704	AC POWER BOX	2317357	METAL BOX AND CABLES	1	2
705	FUSE SET	2317569	FOR 220V	1	2
		2337039	FOR 110V	1	2
706	HARDWARE SET	2331777	BOLT NUT SCREWS	1	2
707	POWER CORD	2389073	FOR JAPAN	1	2
	POWER CORD	2389074	FOR CHINA	1	2

Section 9-12
Options, Peripherals and Cables

Table 9-9 CABLES

Item	Part Name	Part Number	Description	Qty	FRU
800	OP CABLE ASSY	2331742	CABLE SET	1	2
801	PCI CABLE	2363523	CABLE SET	5	3
802	PC CABLE ASSY	2331743	CABLE SET	6	2
803	POWER CABLE ASSY	2331744	110V FOR JAPAN AND USA	6	2
		2356242	220V FOR EUROPE	6	2

Table 9-10 PROBES

Item	Part Name	Part Number	Description	Qty	FRU
804	3C PROBE (EXP)	2286354	PROBE	1	1
805	3.5C PROBE (EXP)	2296158	PROBE	1	1
806	5C PROBE (EXP)	2294516	PROBE	1	1
807	E8C PROBE (EXP)	2294641	PROBE	1	1
808	10L PROBE (EXP)	2294523	PROBE	1	1
809	12L PROBE (EXP)	2295377	PROBE	1	1
810	3S PROBE(EXP) T3308LZ	2250695	PROBE	1	1

Table 9-11 OPTION SVC PARTS

Item	Part Name	Part Number	Description	Qty	FRU
811	FIXTURE FOR B/W PRINTER	2355253	OPTION SVC PART	1	1
812	Fixture for VCR/Color Printer,Side Pocket	2355254	OPTION SVC PART	1	1
813	Fixture for VCR/Color Printer TOP	2355255	OPTION SVC PART	1	1
814	CABEL SET FOR B/W PRINTER	2355256	OPTION SVC PART	1	1
815	CABEL SET FOR COLOR PRINTER	2355257	OPTION SVC PART	1	1
816	CABEL SET VCR	2355258	OPTION SVC PART	1	1
817	MOD	2355259	OPTION SVC PART	1	1
818	ECG KIT	2355260	OPTION SVC PART	1	1
819	INSITE KIT	2355261	OPTION SVC PART	1	1
820	SWIVEL LOCK	2355262	OPTION SVC PART	1	1
821	CWD KIT	2380140	FOR SYSTEM VER HIGER THAN R2.0.1	1	1
822	CWD KIT WITH ATD ASSY	2380142	FOR SYSTEM PRIOR TO VER 2.0.1	1	1

Section 9-12 Options, Peripherals and Cables (cont'd)

Table 9-12 PERIPHERALS

Item	Part Name	Part Number	Description	Qty	FRU
900	SONY UP-895MDW	Local		1	2
901	SONY UP-D895MD	Local		1	2
902	MITSUBISHI P91W	Local		1	2
903	MITSUBISHI P91E	Local		1	2
904	SONY UP-2900MD	Local		1	2
905	SONY UP-21MD	Local		1	2
906	SONY UP-D21MD	Local		1	2
907	SONY UP-51MD	Local		1	2
908	MITSUBISHI CP-900UM	Local		1	2
909	MITSUBISHI CP-900E	Local		1	2
910	SONY SVO-9500MD	Local		1	2
911	SONY SVO-9500MDP	Local		1	2
912	PANASONIC AGM-MD835P	Local		1	2
913	PANASONIC AGM-MD835E	Local		1	2
914	ECG CABLE	Local		1	2
915	PCG MICROPHONE	Local		1	2

Chapter 10
Care & Maintenance

Section 10-1
Overview

10-1-1 Periodic Maintenance Inspections

It has been determined by engineering that your LOGIQ™ 5 system does not have any high wear components that fail with use, therefore no Periodic Maintenance Inspections are mandatory. Some Customers Quality Assurance Programs may require additional tasks and or inspections at a different frequency than listed in this manual.

10-1-2 Purpose of Chapter 10

This chapter describes **Care & Maintenance** on the scanner and peripherals. These procedures are intended to **maintain the quality** of the ultrasound **systems performance**. Read this chapter completely and familiarize yourself with the procedures before performing a task.

Table 10-1 Contents in Chapter 10

Section	Description	Page Number
10-1	Overview	10-1
10-2	Why do Maintenance	10-2
10-3	Maintenance Task Schedule	10-2
10-4	Tools Required	10-4
10-5	System Maintenance	10-5
10-6	Using a Phantom	10-10
10-7	Electrical Safety Tests	10-10
10-9	When There's Too Much Leakage Current...	10-22
	Ultrasound INSPECTION Certificate	10-23

CAUTION **Practice good ESD prevention. Wear an anti–static strap when handling electronic parts and even when disconnecting/connecting cables.**

DANGER **THERE ARE SEVERAL PLACES ON THE BACKPLANE, THE AC DISTRIBUTION, AND DC DISTRIBUTION THAT ARE DANGEROUS. BE SURE TO DISCONNECT THE SYSTEM POWER PLUG AND OPEN THE MAIN CIRCUIT BREAKER BEFORE YOU REMOVE ANY PARTS. BE CAUTIOUS WHENEVER POWER IS STILL ON AND COVERS ARE REMOVED.**

CAUTION **Do not pull out or insert circuit boards while power is ON.**

CAUTION **Do not operate this unit unless all board covers and frame panels are securely in place. System performance and cooling require this.**

Section 10-2
Why do Maintenance

10-2-1 Keeping Records

It is good business practice that ultrasound facilities maintain records of quality checks and corrective maintenance. The Ultrasound Inspection Certificate (provided on page 10-23) provides the customer with documentation that the ultrasound scanner is maintained on a periodic basis.

A copy of the Ultrasound Periodic Maintenance Inspection Certificate should be kept in the same room or near the scanner.

10-2-2 Quality Assurance

In order to gain accreditation from organizations such as the American College of Radiology (USA), it is the customer's responsibility to have a quality assurance program in place for each scanner. The program must be directed by a medical physicists, the supervising radiologist/physician or appropriate designee.

Routine quality control testing must occur regularly. The same tests are performed during each period so that changes can be monitored over time and effective corrective action can be taken.

Testing results, corrective action and the effects of corrective action must be documented and maintained on the site.

Your GE service representative can help you with establishing, performing and maintaining records for a quality assurance program. Please contact us for coverage information and/or price for service.

Section 10-3
Maintenance Task Schedule

10-3-1 How often should care & maintenance tasks be performed?

The Care & Maintenance Task Schedule (provided on page 10-3) specifies how often your LOGIQ™ 5 should be serviced and outlines items requiring special attention.

NOTE: It is the customer's responsibility to ensure the LOGIQ™ 5 care & maintenance is performed as scheduled in order to retain its high level of safety, dependability and performance.

Your GE Service Representative has an in-depth knowledge of your LOGIQ™ 5 ultrasound scanning system and can best provide competent, efficient service. Please contact us for coverage information and/or price for service.

The service procedures and recommended intervals shown in the Care & Maintenance Task Schedule assumes that you use your LOGIQ™ 5 for an average patient load (10-12 per day) and not use it as a primary mobile unit which is transported between diagnostic facilities.

NOTE: If conditions exist which exceed typical usage and patient load, then it is recommended to increase the maintenance frequencies.

Table 10-2 Customer Care Schedule

Service at Indicated Time	Daily	Monthly	Quarterly	Per Facilities QA Program	Notes
Clean Probes	•*				* or before each use
Clean Probe Holders	•				
Clean Air Filter			•		more frequently depending on your environment
Inspect AC Mains Cable		•			Mobile Unit Check Weekly
Inspect Cables and Connectors		•			
Clean Console		•			
Clean Monitor and Touch Panel		•			
Inspect Wheels, Casters, brakes and Swivel Locks		•			Mobile Unit Check Daily
Check Control Panel Movement		•			Mobile Unit Check Daily
Console Leakage Current Checks				•	also after corrective maintenance
Peripheral Leakage Current Checks				•	also after corrective maintenance
Surface Probe Leakage Current Checks				•	also after corrective maintenance
Endocavity Probe Leakage Current Checks				•	also after corrective maintenance
Transesphongeal Probe Leakage Current Checks				•	also after corrective maintenance
Surgical Probe Leakage Current Checks				•	also after corrective maintenance
Measurement Accuracy Checks				•	also after corrective maintenance
Probe/Phantom Checks				•	also after corrective maintenance
Functional Checks				•	also after corrective maintenance

Section 10-4
Tools Required

10-4-1 Special Tools, Supplies and Equipment

10-4-1-1 Specific Requirements for Care & Maintenance

Table 10-3 Overview of Requirements for Care & Maintenance

Tool	Part Number	Comments
Digital Volt Meter (DVM)		
Anti Static Kit	46–194427P231 46–194427P279 46–194427P369 46–194427P373 46–194427P370	Kit includes anti–static mat, wrist strap and cables for 200 to 240 V system 3M #2204 Large adjustable wrist strap 3M #2214 Small adjustable wrist strap 3M #3051 conductive ground cord
Anti Static Vacuum Cleaner	46–194427P278 46–194427P279	120V 230V
Air Filter	Section 9-18	air intake
Safety Analyzer	46–285652G1	DALE 600 KIT (or equivalent) for electrical tests
SVHS VCR Cassette	E7010GG E7010GF	60 minute 120 minute
SVHS VCR Head Cleaner		See VCR user manual for requirements
3.5” MOD MEDIA	E8381AA E8381AB	blank 128 M disk blank 230 M disk
5.25” MOD Media		
3.5” MOD Media Cleaner	2117811	cleans the diskettes
5.25” MOD Media Cleaner		cleans the diskettes
3.5” MOD Head Cleaner Kit	2148392	cleans the drive heads
5.25” MOD Head Cleaner Kit		cleans the drive heads
QIQ Phantom	E8370RB	RMI Grayscale Target Model 403GS
CD-RW Media		For LOGIQ™ 5
B/W Printer Cleaning Sheet		See printer user manual for requirements
Color Printer Cleaning Sheet		See printer user manual for requirements
Disposable Gloves		

Section 10-5
System Maintenance

10-5-1 Preliminary Checks

The preliminary checks take about 15 minutes to perform. Refer to the system user documentation whenever necessary.

Table 10-4 System Checks

Step	Item	Description
1	Ask & Listen	Ask the customer if they have any problems or questions about the equipment.
2	Paperwork	Fill in the top of the Ultrasound Inspection Certificate (see page 23). Note all probes and system options.
3	Power up	Turn the system power on and verify that all fans and peripherals turn on. Watch the displays during power up to verify that no warning or error messages are displayed.
4	Probes	Verify that the system properly recognizes all probes.
5	Displays	Verify proper display on the monitor and touch panel.
6	Presets	Backup all customer presets on an CD-RW.

10-5-2 Functional Checks (See Also Chapter 4)

The functional checks take about 60 minutes to perform. Refer to the system user documentation whenever necessary.

10-5-2-1 System Checks

Table 10-5 System Functional Checks

Check	Step	Description
	B-Mode	Verify basic B-Mode (2D) operation. Check the basic system controls that affect this mode of operation.
	CF-Mode	Verify basic CF-Mode (Color Flow Mode) operation. Check the basic system controls that affect this mode of operation.
	Doppler Modes	Verify basic Doppler operation (PW and CW if available). Check the basic system controls that affect this mode of operation.
	M-Mode	Verify basic M-Mode operation. Check the basic system controls that affect this mode of operation.
	*Applicable Software Options	Verify the basic operation of all optional modes such as Multi-Image, 3D, Contrast, Harmonics, Cine, Stress Echo,... etc. Check the basic system controls that affect each options operation.
	Xmit/Recv Elements	Use the Visual Channel Utility on the 10L probe to verify that all system xmit/recv channels are functional.
	Keyboard Test	Perform the Keyboard Test Procedure to verify that all keyboard controls are OK.
	Monitor	Verify basic Monitor display functions. Refer to Chapter 3 of the User Manual.
	Touch Panel	Verify basic Touch Panel display functions. Refer to Chapter 3 of the User Manual.
	Measurements	Scan a gray scale phantom and use the measurement controls to verify distance and area calculation accuracy. Refer to the User Manual, Chapter 18, for measurement accuracy specifications.

*NOTE: * Some software may be considered standard depending upon system model configuration.*

10-5-2-2 Peripheral/Option Checks

If any peripherals or options are not part of the system configuration, the check can be omitted. Refer to the User Manual for a list of approved peripherals/options.

Table 10-6 GE Approved Peripheral/Hardware Option Functional Checks

Step	Item	Description
1	VCR	Verify record/playback capabilities of the VCR. Clean heads and covers if necessary.
2	B/W Printer	Verify hardcopy output of the B/W video page printer. Clean heads and covers if necessary.
3	Color Printer	Verify hardcopy output of the Color video page printer. Clean heads and covers if necessary.
4	DICOM	Verify that DICOM is functioning properly. Send an image to a DICOM device.
5	InSite/iLinq	Verify that InSite is functioning properly. Ensure two-way remote communications. (Warranty & Contract Customers only)
6	Camera	Verify hardcopy output of the film camera. Clean as necessary.
7	Footswitch	Verify that the footswitch is functioning as programed. Clean as necessary.
8	ECG	Verify basic operation with customer

10-5-3 Input Power

10-5-3-1 Mains Cable Inspection

Table 10-7 Mains Cable Inspection

Step	Item	Description
1	Unplug Cord	Disconnect the mains cable from the wall and system.
2	Inspect	Inspect it and its connectors for damage of any kind.
3	Verify	Verify that the LINE, NEUTRAL and GROUND wires are properly attached to the terminals, and that no strands may cause a short circuit.
4	Verify	Inlet connector retainer is functional.

10-5-4 Cleaning

10-5-4-1 General Cleaning

Table 10-8 General Cleaning

Step	Item	Description
1	Console	Use a fluid detergent in warm water on a soft, damp cloth to carefully wipe the entire system. Be careful not to get the cloth too wet so that moisture does not enter the console.
2	Probe Holder	Clean probe holders (they may need to be soaked to remove excess gel).

10-5-4-2 Air Filter Cleaning

Table 10-9 Air Filter Cleaning - frequency varies with your environment

Step	Item	Description
1	Remove Filter Cover	Refer to Chapter 8 for air filter location and removal instructions.
2	Clean Filter	The filters can be cleaned in sprinkling water, or they can be dusted with a vacuum cleaner. If the filter is metal wash and/or vacuum. If the filter is fiber or plastic vacuum or replace.
3	Install Filter	Install the clean filter.

NOTE: For your convenience or of the air filter is too dirty, replacement filters are available. Refer to Chapter 9 for the air filter replacement part number.

10-5-5 Physical Inspection

Table 10-10 Physical Checks

Step	Item	Description
1	Labeling	Verify that all system labeling is present and in readable condition. Refer to the LOGIQ™ 5 User Manual for details.
2	Scratches & Dents	Inspect the console for dents, scratches or cracks.
3	Control Panel	Inspect keyboard and control panel. Note any damaged or missing items.
4	Control Panel Movement	Verify ease of control panel (Operator I/O Panel) movement in all acceptable directions. Ensure that it latches in position as required.
5	Wheels & Brakes	Check all wheels and casters for wear and verify operation of foot brake, to stop the unit from moving, and release mechanism. Check all caster locks and caster swivel locks for proper operation.
6	Cables & Connectors	Check all internal cable harnesses and connectors for wear and secure connector seating. Pay special attention to footswitch assembly and probe strain or bend reliefs.
7	Shielding & Covers	Check to ensure that all EMI shielding, internal covers, air flow panels and screws are in place. Missing covers and hardware could cause EMI/RFI problems while scanning.
8	External I/O	Check all connectors for damage and verify that the labeling is good.
9	Op Panel Lights	Check for proper operation of all operator panel and TGC lights.
10	Monitor Light	Check for proper operation of any monitor lights if available.
11	External Microphone	Check for proper operation of any external microphones by recording an audio test.

10-5-6 Optional Diagnostic Checks

Optionally you can access the diagnostic software as described in Chapters 5 or 7. View the error logs and run desired diagnostics.

10-5-6-1 View the Logs

1.) Review the system error log for any problems.

2.) Check the temperature log to see if there are any trends that could cause problems in the future.

3.) Check the Configuration Log; update if needed.

10-5-7 Probe Maintenance

10-5-7-1 Probe Related Checks

Table 10-11 Probe Related Checks

Step	Item	Description
1	Probe Holder	Clean probe holders (they may need to be soaked to remove excess gel).
2	Probes	Thoroughly check the system probe connectors and remove dust from inside the connector sockets if necessary. Visually check for bent, damaged or missing pins

10-5-7-2 Basic Probe Care

The system user manuals and various probe handling cards provide a complete description of probe care, maintenance, cleaning and disinfection. Ensure that you are completely familiar with the proper care of GE probes.

Ultrasound probes can be easily damaged by improper handling. See the User Manual and probe care cards for more details. Failure to follow these precautions can result in serious injury and equipment damage. Failure to properly handle or maintain a probe may also void its warranty.

Any evidence of wear indicates the probe cannot be used.

Do a visual check of the probe pins and system sockets before plugging in a probe.

TEE and Interoperative probes often have special considerations and individual probe user manuals. For TEE and Interoperative probes also refer to their separate user manuals.

10-5-7-3 Basic Probe Cleaning

Refer to the User's Manual for details on probe cleaning.

NOTE: To help protect yourself from blood borne diseases, wear approved disposable gloves. These are made of nitrile derived from vegetable starch to prevent allergic latex reactions.

NOTE: Failure to follow the prescribed cleaning or disinfection procedures will void the probe's warranty. DO NOT soak or wipe the lens with any product not listed in the User Manual. Doing so could result in irreparable damage to the probe. Follow care instructions that came with the probe.

NOTE: Disinfect a defective probe before you return it. Be sure to tag the probe as being disinfected.

Section 10-6
Using a Phantom

See the Basic User Manual "*Customer Maintenance*" for information on using a phantom and quality assurance tests.

Section 10-7
Electrical Safety Tests

10-7-1 Safety Test Overview

The electrical safety tests in this section are based on and conform to NFPA 99 (For USA) and IEC 60601-1 Medical Equipment Safety Standards. They are intended for the electrical safety evaluation of cord-connected, electrically operated, patient care equipment. If additional information is needed, refer to the NFPA 99 (For USA) and IEC 60601-1 documents.

WARNING ***THE USER MUST ENSURE THAT THE SAFETY INSPECTIONS ARE PERFORMED AT LEAST EVERY 12 MONTHS ACCORDING TO THE REQUIREMENTS OF THE PATIENT SAFETY STANDARD IEC-EN 60601-1. ONLY TRAINED PERSONS ARE ALLOWED TO PERFORM THE SAFETY INSPECTIONS MENTIONED ABOVE.***

CAUTION **To avoid electrical shock, the unit under test must not be connected to other electrical equipment. Remove all interconnecting cables and wires. The unit under test must not be contacted by users or patients while performing these tests.**

CAUTION **Possible risk of infection. Do not handle soiled or contaminated probes and other components that have been in patient contact. Follow appropriate cleaning and disinfecting procedures before handling the equipment.**

Test the system, peripherals and probes for leakage current. Excessive leakage current can cause injury or death in sensitive patients. High leakage current can also indicate degradation of insulation and a potential for electrical failure. Do not use probes or equipment having excessive leakage current.

To minimize the risk that a probe may shock someone the customer should:

- Not use a probe that is cracked or damaged in any way
- Check probe leakage current:
    * Based on your facilities QA program for surface probes
    * Based on your facilities QA program for endocavitary probes
    * whenever probe damage is suspected

10-7-2 GEMS Leakage Current Limits

The following limits are summarized for NFPA 99 (For USA) and IEC 60601-1 Medical Equipment Safety Standards. These limits are GEMS standards and in some cases are lower than the above standards listed.

Table 10-12 Chassis Leakage Current Limits—Accessible Metal Surfaces

Country	Normal Condition	Open Ground	Reverse Polarity	Open Neutral
USA	N/A	0.3 mA	0.3 mA	N/A
Other	0.1 mA	0.5 mA	0.5 mA	0.5 mA

Table 10-13 Type BF Applied Part Leakage Current Limits - Non-Conductive (Floating) Surface and Cavity Probes

Country	Normal Condition	Open Ground	Reverse Polarity	Open Neutral	*Mains Applied
USA	0.05 mA	0.05 mA	0.05 mA	0.05 mA	N/A
Other	0.1 mA	0.5 mA	0.5 mA	0.5 mA	5.0 mA

Table 10-14 Type CF Applied Part Leakage Current Limits - Surgical Probes and ECG Connections

Country	Normal Condition	Open Ground	Reverse Polarity	Open Neutral	*Mains Applied
USA	0.01 mA	0.05mA	0.05 mA	N/A	0.025 mA
Other	0.01 mA	0.05 mA	0.05 mA	0.05 mA	0.05 mA

*NOTE: *Mains Applied refers to the sink leakage test where mains (supply) voltage is applied to the part to determine the amount of current that will pass (or sink) to ground if a patient contacted mains voltage.*

The following tests are performed at the factory and should be performed at the site. These tests are: grounding continuity, chassis leakage current, probe leakage current, and ECG leakage current. All measurements are made with an electrical safety analyzer.

10-7-3 Outlet Test - Wiring Arrangement - USA & Canada

Test all outlets in the area for proper grounding and wiring arrangement by plugging in the neon outlet tester and noting the combination of lights that are illuminated. Any problems found should be reported to the hospital immediately and the receptacle should not be used.

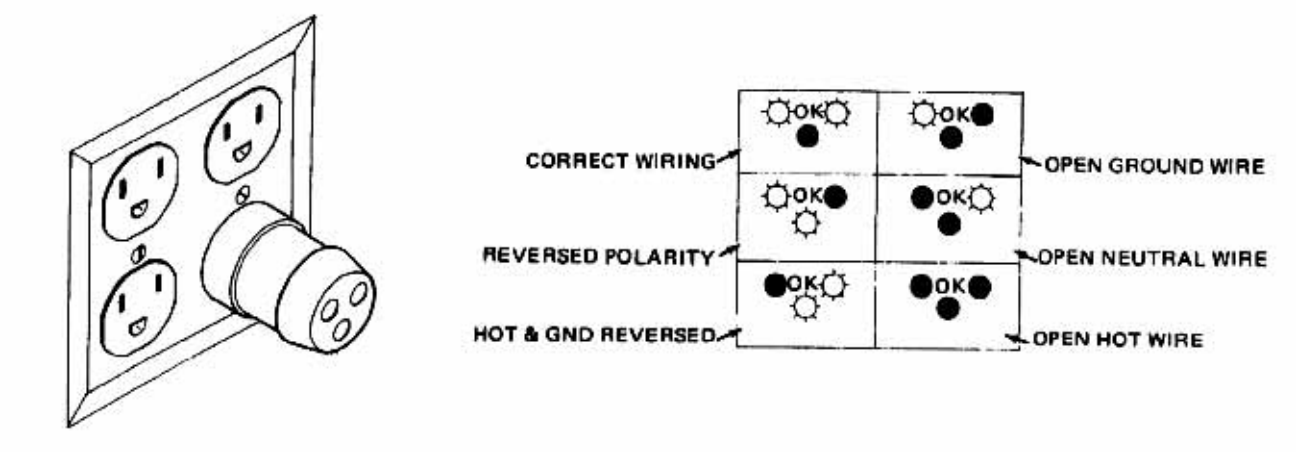


Figure 10-1 Typical Outlet Tester

NOTE: No outlet tester can detect the condition where the Neutral (grounded supply) conductor and the Grounding (protective earth) conductor are reversed. If later tests indicate high leakage currents, this should be suspected as a possible cause and the outlet wiring should be visually inspected.

Section 10-8Grounding Continuity

CAUTION **Electric Shock Hazard. The patient must not be contacted to the equipment during this test**

Measure the resistance from the third pin of the attachment plug to the exposed metal parts of the case. The ground wire resistance should be less than **0.2** ohms. Reference the procedure in the IEC 601-1.1.

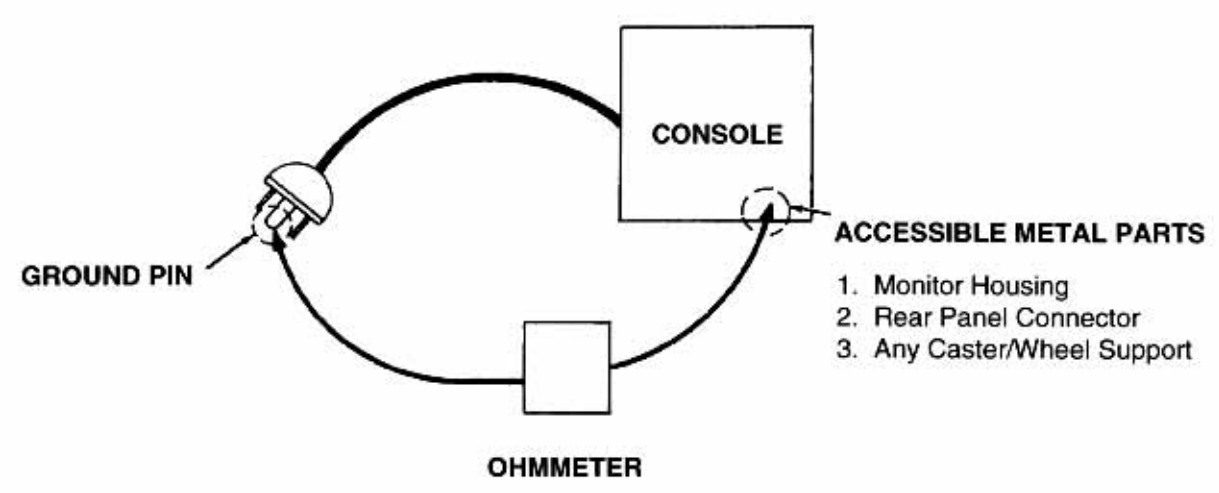


Figure 10-2 Ground Continuity Test

10-8-0-1 Meter Procedure

Follow these steps to test the ground wire resistance.

1.) Turn the LOGIQ™ 5 unit OFF.
2.) Plug the unit into the meter, and the meter into the tested AC wall outlet.
3.) Plug the black chassis cable into the meter's “CHASSIS” connector and attach the black chassis cable clamp to an exposed metal part of the LOGIQ™ 5 unit.
4.) Set the meter's “FUNCTION” switch to the RESISTANCE position.
5.) Set the meter's “POLARITY” switch to the OFF (center) position.
6.) Measure and record the ground wire resistance.

10-8-1 Chassis Leakage Current Test

10-8-1-1 Definition

This test measures the current that would flow in a grounded person who touched accessible metal parts of the bedside station if the ground wire should break. The test verifies the isolation of the power line from the chassis. The meter is connected from accessible metal parts of the case to ground. Measurements should be made with the unit On and Off, with the power line polarity Normal and Reversed. Record the highest reading.

.

CAUTION **Electric Shock Hazard. When the meter's ground switch is OPEN, don't touch the unit!**

CAUTION **Equipment damage possibility. Never switch the Polarity and the status of Neutral when the unit is powered ON. Be sure to turn the unit power OFF before switching them using the POLARITY switch and/or the NEUTRAL switch. Otherwise, the unit may be damaged.**

10-8-1-2 Generic Procedure

The test verifies the isolation of the power line from the chassis. The testing meter is connected from accessible metal parts of the case to ground. Measurements should be made with the unit ON and OFF, with the power line polarity Normal and Reversed. Record the highest reading of current.

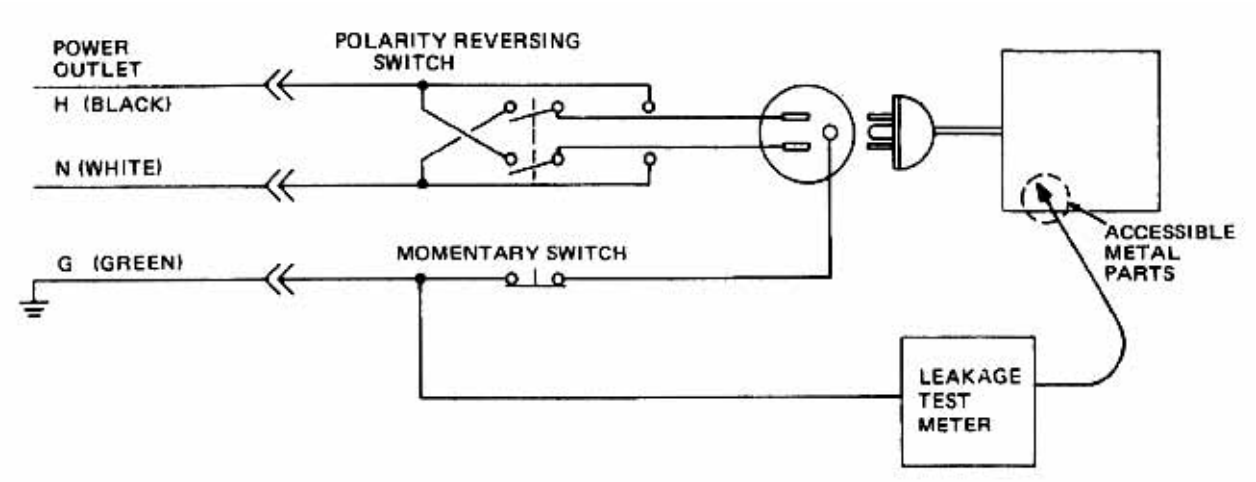


Figure 10-3 Set Up for Chassis Source Leakage Current, IEC 601-1 Clause 19 - Continuos Leakage Currents and Patient, Auxiliary Currents

When using the Microguard or a similar test instrument, its power plug may be inserted into the wall outlet and the equipment under test is plugged into the receptacle on the panel of the meter. This places the meter in the grounding conductor and the current flowing from the case to ground will be indicated in any of the current ranges. The maximum allowable limit for chassis source leakage is shown in Table 10-12.

7.) Follow the test conditions described for respective test points shown in Table 10-15.

Table 10-15 Chassis Leakage Current Test Condition

TEST	CONDITION
1	Mounting screw for probe receptacle
2	caster support
3	Mounting screw for CRT housing
4	Mounting screw for peripheral plugged into unit
5	Mounting screw for other peripheral powered by unit

8.) Keep a record of the results with other hard copies of PM data kept on site.

10-8-1-3 Data Sheet for Chassis Source Leakage Current

The test passes when all readings measure less than the value shown in Table 10-12. Record all data on the PM Inspection Certificate.

Table 10-16 Typical Data Sheet for Chassis Source Leakage Current

Unit Power	Tester Polarity Switch	Tester Neutral or Ground Switch	Test 1 Probe Connector	Test 2 caster	Test 3 CRT	Optional Test 4	Optional Test 5
Enter Name of tested peripheral here:							
ON	NORM	OPEN					
ON	NORM	CLOSED					
ON	REV	OPEN					
ON	REV	CLOSED					
OFF	NORM	OPEN					
OFF	NORM	CLOSED					
OFF	REV	OPEN					
OFF	REV	CLOSED					

10-8-2 Isolated Patient Lead (Source) Leakage–Lead to Ground

10-8-2-1 Definition

This test measures the current which would flow to ground from any of the isolated ECG leads. The meter simulates a patient who is connected to the monitoring equipment and is grounded by touching some other grounded surface. Measurements should be made with the ground open and closed, with power line polarity normal and reversed, and with the ultrasound console Off and On. For each combination the operating controls, such as the lead switch, should be operated to find the worst case condition.

CAUTION **Equipment damage possibility. Never switch the Polarity when the unit is powered ON. Be sure to turn the unit power OFF before switching the polarity using the POLARITY switch. Otherwise, the unit may be damaged.**

10-8-2-2 Generic Procedure

Measurements should be made with the ground open and closed, with power line polarity normal and reversed, and with the unit Off and On. For each combination, the operating controls such as the lead switch should be operated to find the worst case condition.

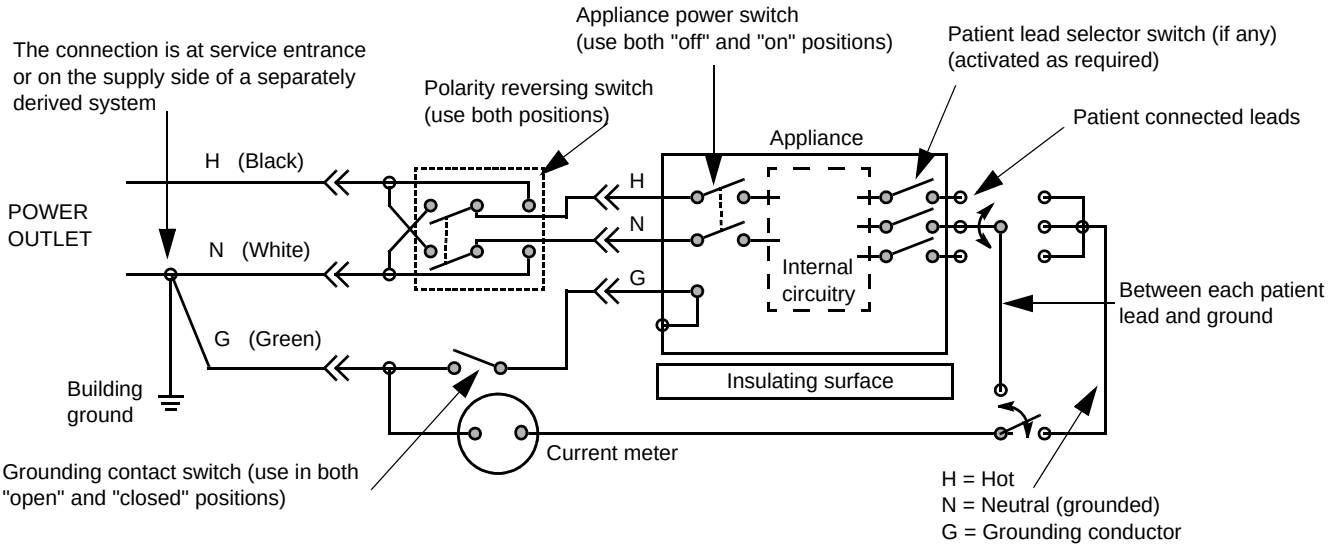

The connection is at service entrance or on the supply side of a separately derived system
Appliance power switch (use both "off" and "on" positions)
Patient lead selector switch (if any) (activated as required)
Polarity reversing switch (use both positions)
Patient connected leads
Appliance
H (Black)
POWER OUTLET
N (White)
G (Green)
H
N
G
Internal circuitry
Between each patient lead and ground
Insulating surface
Building ground
Current meter
Grounding contact switch (use in both "open" and "closed" positions)
H = Hot
N = Neutral (grounded)
G = Grounding conductor

Figure 10-4 Test Circuit for Measuring Non-Isolated Patient Leads

Table 10-17 Testing Power Conditions

ECG Power	Meter's Polarity Switch	Meter's Neutral Switch
ON	NORM	CLOSED
ON	NORM	OPEN
ON	REVERSE	CLOSED
ON	REVERSE	OPEN
OFF	NORM	CLOSED
OFF	NORM	OPEN
OFF	REVERSE	CLOSED

Table 10-17 Testing Power Conditions

ECG Power	Meter's Polarity Switch	Meter's Neutral Switch
OFF	REVERSE	OPEN

10-8-3 Isolated Patient Lead (Source) Leakage–Lead to Lead

Reference the procedure in the IEC 60601-1. When using the Dale 600, switch the meter's function selector to the LEAD-LEAD position. Select and test each of the five ECG lead positions (except ALL) on the LEAD selector, testing each to the power condition combinations found in the table. Record the highest leakage current measured.

10-8-4 Isolated Patient Lead (Sink) Leakage-Isolation Test

Reference the procedure in the IEC 60601-1. When using the Dale 600, switch the meter's function selector to the LEAD-ISO. Select the ALL position on the lead selector. Depress the rocker switch to ISO TEST to test lead isolation.

CAUTION **Line voltage is applied to the ECG leads during this test. To avoid possible electric shock hazard, the system being tested must not be touched by patients, users or anyone while the ISO TEST switch is depressed.**

NOTE: It is not necessary to test each lead individually or power condition combinations as required in previous tests.

10-8-4-1 Data Sheet for ECG Leakage Current

The test passes when all readings measure less than the value shown in the table below. Record all data on the PM Inspection Certificate.

Table 10-18 Maximum Allowance Limit for ECG Leakage Current

	AC Power Source	Maximum Allowance Limit	
		GROUND OPEN	GROUND CLOSED
Patient Lead to Ground Leakage Current Test	115V	10uA	10uA
and Patient Lead to Lead Leakage Current Test	220/240V	500uA	10uA

Table 10-19 Maximum Allowance Limit for ECG Leakage Current

	AC Power Source	Maximum Allowance Limit
Patient Lead Isolation Current Test	115V	20uA
	220/240V	5mA

Table 10-20 Typical Data Sheet for ECG Leakage Current

ECG Power	Tester Polarity Switch	Tester Ground Switch	Tester Lead Selector				
			RL	RA	LA	LL	C
ON	NORM	CLOSED					
ON	REVERSE	CLOSED					
ON	NORM	OPEN					
ON	REVERSE	OPEN					
OFF	NORM	CLOSED					
OFF	REVERSE	CLOSED					
OFF	NORM	OPEN					
OFF	REVERSE	OPEN					

10-8-5 Probe Leakage Current Test

10-8-5-1 Definition

This test measures the current that would flow to ground from any of the probes through a patient who is being scanned and becomes grounded by touching some other grounded surface.

10-8-5-2 Generic Procedure

Measurements should be made with the ground open and closed, with power line polarity normal and reversed, and with the unit Off and On. For each combination, the probe must be active to find the worst case condition.

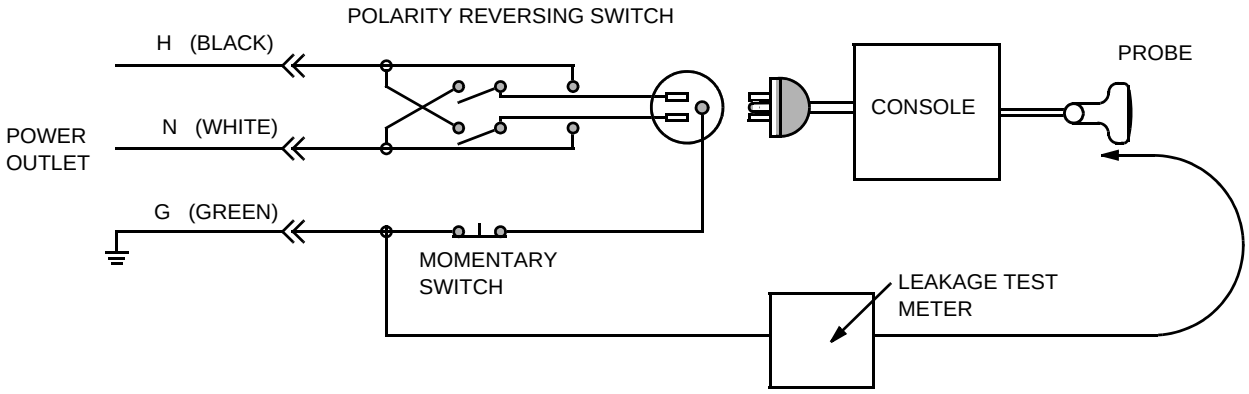


Figure 10-5 Set Up for Probe Leakage Current

NOTE: Each probe will have some amount of leakage current, dependent on its design. Small variations in probe leakage currents are normal from probe to probe. Other variations will result from differences in line voltage and test lead placement.

10-8-5-3 No Meter Probe Adapter Procedure

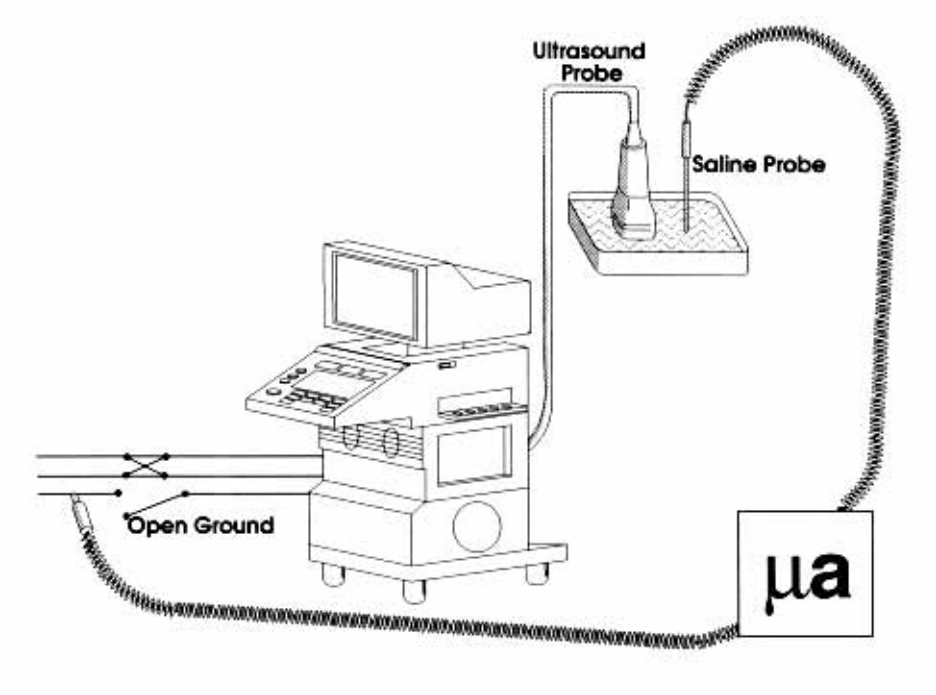


Figure 10-6 Check Without Probe Adapter

Follow these steps to test each transducer for leakage current.

1.) Turn the LOGIQ™ 5 unit OFF.
2.) Plug the unit into the test meter, and the meter into the tested AC wall outlet.
3.) Plug the external probe into the meter's “EXTERNAL” connector.
4.) Set the meter's “FUNCTION” switch to EXTERNAL position.
5.) Connect the probe for test with the connector of the console.
6.) Add the saline probe and the imaging area of the probe into the saline bath.
7.) Have unit power ON for the first part; turn it OFF for the second half.
8.) Depress the ISO TEST rocker switch and record the highest current reading.
9.) Follow the test conditions described in Table 10-21 for every transducer.
10.) Keep a record of the results with other hand copies of PM data.

10-8-5-4 Data Sheet for Transducer Source Leakage Current

The test passes when all readings measure less than the values shown in Table 10-13 and Table 10-14. Record all data on the PM Inspection Certificate.

CAUTION **Equipment damage possibility. Never switch the Polarity and the status of Neutral when the unit is powered ON. Be sure to turn the unit power OFF before switching them using the POLARITY switch and/or the NEUTRAL switch. Otherwise, the unit may be damaged**

.

Table 10-21 Typical Data Sheet For Transducer Source Leakage Current

Transducer Tested:			
Unit Power	**Tester Power Polarity Switch**	**Tester GROUND or NEUTRAL Switch**	**Measurement**
ON	NORM	OPEN	
ON	NORM	CLOSED	
ON	REV	OPEN	
ON	REV	CLOSED	
OFF	NORM	OPEN	
OFF	NORM	CLOSED	
OFF	REV	OPEN	
OFF	REV	CLOSED	

Section 10-9
When There's Too Much Leakage Current...

CHASSIS FAILS

Check the ground on the power cord and plug for continuity. Ensure the ground is not broken, frayed, or intermittent. Replace any defective part.

Tighten all grounds. Ensure star washers are under all ground studs.

Inspect wiring for bad crimps, poor connections, or damage.

Test the wall outlet; verify it is grounded and is free of other wiring abnormalities. Notify the user or owner to correct any deviations. As a work around, check the other outlets to see if they could be used instead.

NOTE: No outlet tester can detect the condition where the white neutral wire and the green grounding wire are reversed. If later tests indicate high leakage currents, this should be suspected as a possible cause and the outlet wiring should be visually inspected.

PROBE FAILS

Test the probe in another connector to isolate if the fault lies with the probe or the scanner.

NOTE: Each probe will have some amount of leakage, dependent on its design. Small variations in probe leakage currents are normal from probe to probe. Other variations will result from differences in line voltage and test lead placement. The maximum allowable leakage current for body surface contact probe differs from inter-cavity probe. Be sure to enter the correct probe type in the appropriate space on the check list.

If excessive leakage current is slot dependent, inspect the system connector for bent pins, poor connections, and ground continuity.

If the problem remains with the probe, replace the probe.

PERIPHERAL FAILS

Tighten all grounds. Ensure star washers are under all ground studs.

Inspect wiring for bad crimps, poor connections, or damage.

STILL FAILS

If all else fails, begin isolation by removing the probes, external peripherals, then the on board ones, one at a time while monitoring the leakage current measurement.

NEW UNIT

If the leakage current measurement tests fail on a new unit and if situation can not be corrected, submit a Safety Failure Report to document the system problem. Remove unit from operation.

ECG FAILS

Inspect cables for damage or poor connections.

ULTRASOUND INSPECTION CERTIFICATE

Customer Name:		System ID:	Dispatch Number / Date Performed:	Warranty/Contract/HBS
System Type		Model Number:	Serial Number:	Manufacture Date:
Probe 1:	Frequency:	Scan Format*:	Model Number:	Serial Number:
Probe 2:	Frequency:	Scan Format*:	Model Number:	Serial Number:
Probe 3:	Frequency:	Scan Format*:	Model Number:	Serial Number:
Probe 4:	Frequency:	Scan Format*:	Model Number:	Serial Number:
Probe 5:	Frequency:	Scan Format*:	Model Number:	Serial Number:
Probe 6:	Frequency:	Scan Format*:	Model Number:	Serial Number:
Probe 7:	Frequency:	Scan Format*:	Model Number:	Serial Number:
Probe 8:	Frequency:	Scan Format*:	Model Number:	Serial Number:
Probe 9:	Frequency:	Scan Format*:	Model Number:	Serial Number:

* Scan Format: Phased Array, Linear Array, Curved Array, Mechanical Array or Other

FUNCTIONAL CHECKS

Functional Check (if applicable)	OK? or N/A
B-Mode Function	
Doppler Modes Function	
CF-Mode Function	
M-Mode Function	
Applicable Software Options	
Applicable Hardware Options	
Control Panel	
Monitor	
Touch Panel	
Measurement Accuracy	
GE Approved Peripherals	

PHYSICAL INSPECTION AND CLEANING

Physical Inspection and Cleaning (if applicable)	Inspect	Clean
Console		
Monitor		
Touch Panel		
Air Filter		
Probe Holders		
External I/O		
Wheels, Brakes & Swivel Locks		
Cables and Connectors		
GE Approved Peripherals (VCR, CD-RW, MOD, Printers)		

COMMENTS:

_____

_____

_____

_____

ELECTRICAL SAFETY

Electrical Test Performed	Max Value Allowed	Value Measured	OK?	Comments
Outlet (correct ground &wiring config.)				
System Ground Continuity				
Chassis Source Leakage Current - Probe				
Chassis Source Leakage Current - Caster				
Chassis Source Leakage Current - CRT				
Patient Lead Source Leakage (Lead to Ground)				
Patient Lead Source Leakage (Lead to Lead)				
Patient Lead Source Leakage (Isolation)				
Peripheral 1 Leakage Current				
Peripheral 1Ground Continuity				
Peripheral 2 Leakage Current				
Peripheral 2Ground Continuity				
Peripheral 3 Leakage Current				
Peripheral 3Ground Continuity				
PROBES				
Probe Number (from previous page)	**Max Value Allowed**	**Max Value Measured**	**OK?**	**Comments**
Probe 1:				
Probe 2:				
Probe 3:				
Probe 4:				
Probe 5:				
Probe 6:				
Probe 7:				
Probe 8:				
Probe 9:				

Final Check. All system covers are in place. System scans with all probes as expected.

Accepted by: _____

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